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Photograph by R. L. Walsh, staff photographer, Binghamton Press.

GRADE SEPARATION WORK PARTLY COMPLETED, PART UNDER CONSTRUCTION.

ELIMINATING A GRADE CROSSING

At Binghamton, N. Y.—Retaining Wall and Abutment, Design and Construction—Handling the Drainage and Sewer Problem—Gravel from Excavation Used for Concrete—Tower Method of Distributing Concrete.

By J. A. GILES, City Engineer.

Following the petition from the Common Council, public hearings and the submission of tentative plans, the Public Service Commission, 2d District, of the State of New York ordered the elimination of the Robinson street grade crossing in the city of Binghamton, N. Y., on the 11th day of March, 1912.

Robinson street, being one of the main thoroughfares to the eastern part of the city, was originally crossed at grade at the point of the present elimination by two main tracks of the Delaware & Hudson Co.'s Railroad, three tracks of the Utica and Syracuse Divisions of the Delaware, Lackawanna & Western R. R. and by a single industry spur.

A single track of the Binghamton Street Railway Co. also operates on this street and the crossing was considered a most dangerous one, as well as an inconvenience to pedestrians and heavy commercial vehicular traffic, in as much as a large freight yard of the D., L. & W. Ry. lies just west of the crossing with its main switching lead extending across the street, which resulted in frequent blockades by switching operations.

Complete plans for the masonry and bridge work for the improvement were drawn by the engineers of the two railroad companies, and those for the drainage and street work by the city of Binghamton. These were approved

by the Public Service Commission and may be generally described as follows:

The entire length of the work is 990 feet from top of approach to top of approach. The level portion under the tracks and right-of-way of the two railroad companies is 390 feet long, with 4 per cent approaches extending east and west to meet the original natural surface. The center line of the undergrade crossing coincides with the existing center line of Robinson street.

The maximum cut from the old ground surface to sub-base of new pavement is 16 feet and the distance from top of finished pavement to base of low rail is now 16.75 feet, the railroad companies having raised their tracks above their old grade line. The clear width of the sub-way from neat line of abutment to neat line of abutment is 50 feet, the roadway being 34 feet in width with an 8 foot sidewalk on each side. The clear headroom from top of pavement to low iron is 13 feet.

All bridges, except the industry spur, are shallow floor deck type, in three spans, the exterior support being masonry abutments, the intermediate supports being metal bents located just inside the curb line.

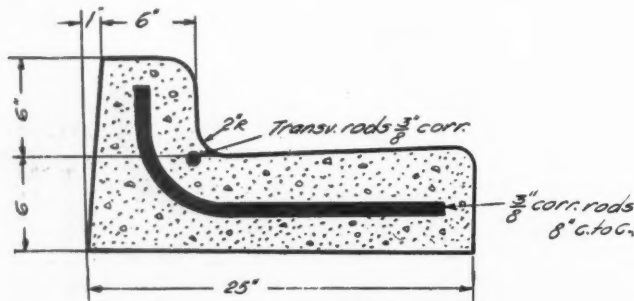
The industry spur is carried over the street by a one-span through plate girder.

Abutment and retaining wall sections are of the grav-

ity type, designed with the base .45 of the height, having a footing course 2 feet deep, with an offset front and rear from bottom of wall of 12 inches.

The faces of abutments and retaining walls are vertical with 12-inch coping extending beyond face of wall by 3 inches and 1 foot 9 inches wide. The backs of walls are constructed with a straight slope, the batter changing with height of wall.

Owing to the excellent quality of gravel encountered in the excavation for the subway, the contractor was allowed to use this material for the concrete, the mixture being 1:3:6.



STANDARD CURB AND GUTTER.

The forms were made of surfaced, dressed and matched materials, all heavy material being carefully spaded back from face of walls to give a smooth and uniform appearance and absence of voids.

The main line traffic of the two railroads was carried on pile falsework during construction, each railroad doing its own pile-driving and bridge work, which is charged against the work.

On account of the fact that ground waters had been observed to reach an elevation at least one foot higher than the proposed level of the subway floor (elevation 837) all masonry work to an elevation of 840 and all foundations of the street and sidewalk pavements were thoroughly waterproofed with three-ply waterproof felt and mopped with Barrett specification pitch, and in addition the D., L. & W. Ry. mopped the back of all walls on their right-of-way to the top with an asphaltic preparation.

The concrete foundation under the pavement, where subject to upward pressure of the water, was made extra thick, on the assumption that the weight of a cubic foot of concrete would counteract the upward pressure of a two-foot head of water.

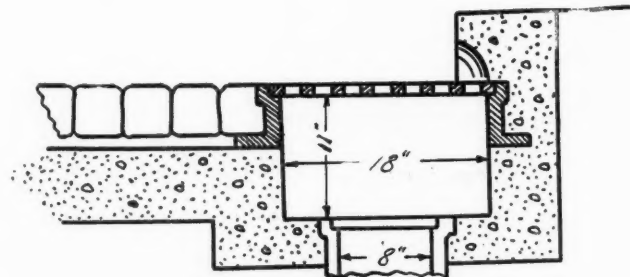
To care for the storm water flow tributary to the area of the subway, two systems of drainage were installed: 1. A gravity system operating under normal conditions when the Susquehanna river (and consequently the ground water) is low, which intercepts a local rain storm at the several street inlets and is conducted 727 feet through a 24-inch vitrified pipe sewer to an adjacent stream known as Brandywine creek. This pipe is double strength, has a very slight fall of one foot in 727 feet, with its joints filled with G. K. sewer joint compound to prevent infiltration.

Adjacent to the subway, and between the street inlets and the outfall, the gravity sewer passes through a sump chamber which intercepts the street detritus and is fitted with a flap valve which prevents the creek

from backing through the gravity sewer in times of high water.

2. A system by means of which, during periods when the gravity drainage system is unavailable, the surface water is diverted automatically to a pump chamber fitted with two vertical centrifugal bilge pumps guaranteed to deliver 550 gallons per minute each, at a 12 foot lift. These pumps are operated with two 5 h. p. motors, 3-phase, 60-cycle, 220 volts, the current being furnished by the local electric power company.

When the valve is closed in the sump chamber by high water as noted above, the storm-water from the sub-



SURFACE WATER INLET.

way enters the pump chamber and raises a float connected to an electric switch which starts the pumps automatically. The water is pumped directly to the sump chamber, which acts as a standpipe and provides for a greater head than has ever been observed at high water.

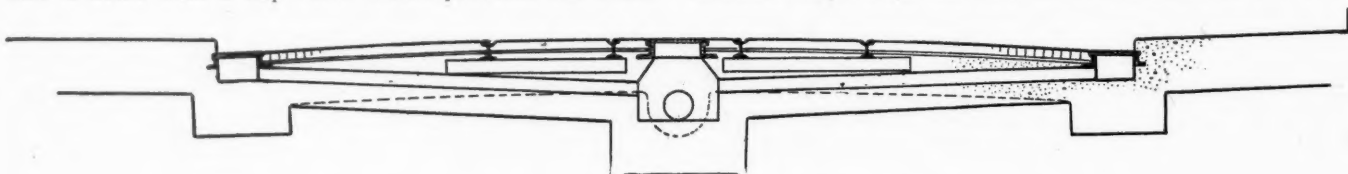
As an extra precaution in case the valves do not operate properly, an overflow is provided to allow the water to flow out near the top and to the surface of the ground, which slopes away from the subway walls.

The pump chamber is covered with a substantial brick pump house.

The main sanitary sewer existing in the street was necessarily disturbed by the excavation for the subway, being only 8 feet deep. The flow during construction was cared for by supporting the pipes on a frame trestle to maintain its grade line until the new sewers, which were laid behind the walls on a bench and on a higher elevation than the lower part of the subway, could be operated. Each side of the street is now provided with sanitary sewage facilities which converge to the center of the street near the top of the approach, where the old sewer was not disturbed. For a short distance on one side of the subway the pipe is laid in the retaining wall, there being no supporting ground in the rear of the wall. The pipe is enclosed in wool-felt with its joints laid in G. K. sewer joint compound.

The roadway is paved throughout, including the approaches, with vitrified shale paving blocks laid under city specifications. The concrete sidewalks and curbing are constructed as one piece, with transverse joints every six feet. The edge of curb is protected with a patent steel edging protector.

In addition to residential property abutting on the street, two commercial enterprises, viz., The Empire Grain and Elevator Company and the Commercial Envelope Company, are cared for by paved driveways and concrete steps from the new lower elevation to the old



SURFACE WATER SEWER, MANHOLE AND SIDE INLETS IN DEPRESSED STREET.

ground surface. The driveways are built on an 8 per cent grade and the concrete steps with a 7-inch riser and a 10-inch tread, provided with hand railing.

The damages incident to the work were, in all but two cases, settled promptly and without much trouble, the parties doing the construction obtaining rights and easements to construct retaining walls and to lay water pipes, gas pipes and sewers on the several pieces of property with the perpetual right to enter same at any time for repairs. In addition to money consideration for such privileges they were to provide sufficient steps and driveways.

The owners of the two parcels of right-of-way not settled for, preferred to see the work finished before naming a price for damages, so that the work was not delayed or hampered by condemnation proceedings.

CONTRACTOR'S PLANT.

The excavation for half of the work was carried down to subgrade by means of a Thew steam-shovel, $\frac{5}{8}$ -yard dipper, and wasted a short distance away by wagons. The remaining portion was stripped to a depth of 4 feet, where the suitable sand and gravel mentioned previously were encountered.

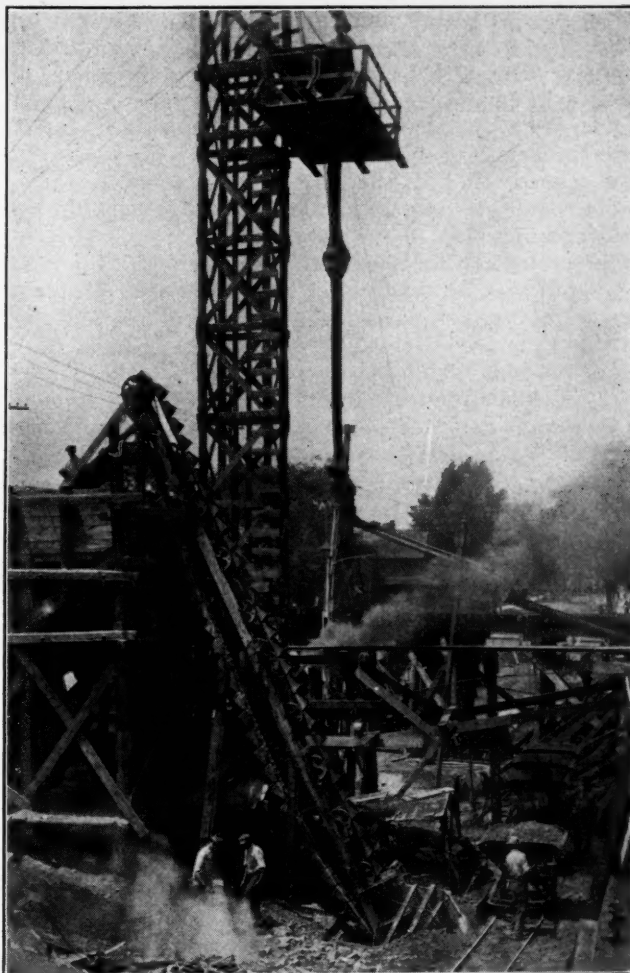
In the center of that portion which had been excavated to subgrade, the contractor erected a bin and screen; under the bin a concrete mixer with a capacity of 24 cu. ft. (dry measure) was placed, which, in conjunction with a tower and steel chutes, was the method employed for mixing and placing the concrete.

The material suitable for concrete, as excavated, was brought to the bin by the means of Koppel cars which were drawn by horses, where it was dumped into a hopper and was thence conveyed by means of buckets to the top of the bin and at that point fell into the screen mentioned; the bin being so arranged that the coarse aggregate as screened fell into one compartment and the fine aggregate into another.

After that portion of the concrete work was finished within the limits of the tower and chutes, the entire plant was moved to a position approximately central to the remaining portion of the work to be completed. The tower was lowered and re-erected as a unit.

Not only were the abutments and retaining walls concreted in this manner, but the foundations for the street pavement also. The maximum quantity of concrete placed in any one 10-hour shift was 216 cu. yds.

The detail of the tower is as follows: Two pieces of



Photograph by R. L. Walsh.
GRAVEL ELEVATOR, BINS, CONCRETE MIXER AND
DISTRIBUTING TOWER.

3x6 were spiked together and used as corner legs. Joints occurred every twelve feet, at which point they were bolted, the joint being a lap construction. The legs were then X-braced by 2x6's which were lag screwed to the legs. The longitudinal bracing was of 1x6's. The tower was 78 feet high.

The contract prices for the more important items were: Excavation, 46 cts. per cu. yd.; foundation exca-



Photograph by R. L. Walsh, staff photographer, Binghamton Press.
CONSTRUCTION WORK. POURING BRIDGE ABUTMENT CONCRETE.

vation, 70 cts.; plain concrete, \$5.40; concrete sidewalks, 15 cts. a sq. ft.; 1:4:8 concrete under sidewalk and roadway pavement, \$4.40 per cu. yd.; brick pavement, \$2.10 per sq. yd.; concrete curb, 25 cts. per lin. ft.; stone curb, 20 cts. per lin. ft.; stone flagging, 15 cts. per sq. ft.; brick gutters, 25 cts. per sq. ft.

The construction of the 24 inch gravity sewer, waterproofing and shoring up of buildings was paid for by force account plus 10 per cent.

The contractor for the work was John M. Holler of Albany, N. Y.; H. L. Gabriel being the superintendent for the contractor. The engineers representing the parties to the work were A. H. Suitermeister, engineer of grade crossings, Public Service Commission, 2d District; C. E. Wickham, division engineer, D., L. & W. Ry.; F. D. Anthony, engineer of construction, D. & H. R. R. Co., and J. A. Giles, city engineer, city of Binghamton.

PAYMENT FOR STREET OPENINGS

Land Paid for from City Treasury, Condemned or Donated—Practice in More Than Twenty Cities—Assessing Benefits

Mayor R. J. Davant, of Savannah, Ga., on December 10th presented to council a message dealing with the question of opening streets, which was especially notable for the amount of definite information conveyed, based upon careful investigation of conditions in other cities. This message dealt with the question of payment for the opening of new streets as well as for the improvement of them. The mayor believed that the practice of paying for the land occupied by new streets out of the taxes contributed by all the property owners of the city was wrong in principle, but that such payment should be made more directly by the parties benefited. He also learned that the method employed at Savannah was not the one in common practice elsewhere. This latter information he obtained from correspondence directly with mayors of more than a score of the leading cities of the country, such as Louisville, Buffalo, Minneapolis, Springfield, Mass., Portland, Ore., etc.

From his investigation of the subject he found in apparently successful operation three systems, in addition to the one practiced in Savannah of purchasing from the owners the land for all streets. The first system is that of excess condemnation, which has been discussed several times in *Municipal Journal*. He found that in some instances cities have more than reimbursed themselves for the original cost of the land and its improvements, while it was found that European cities secured in this way about 40 per cent of the expenditures for such improvements. Massachusetts has provided for this system by a constitutional amendment; Ohio has a constitutional amendment permitting its municipalities to adopt the system and to issue bonds based upon the excess land thus acquired; and some Connecticut cities enjoy the privilege. Cleveland anticipates saving \$400,000 in the opening of Cleveland avenue alone. In New York and several other states there is agitation for a constitutional amendment providing for excess condemnation.

The second system is that of assessing the cost upon the property owners immediately or directly benefited by the opening of a highway. Under this system the land for street purposes is condemned and paid for by the city, but the cost is then assessed against the property in the neighborhood which is benefited by the opening of the street. This is done not only where an entirely new highway is laid out, but where a street is extended for a short distance.

The third method is that of compulsory dedication of land for streets where highways are to be laid out

through large tracts, the resulting benefits to the owners of the adjacent lands compensating them for the land surrendered to the city for such public purposes. "Generally a combination of the second and third system is found working effectively, the burden of the street opening being put where it logically belongs—upon the land that is permanently benefited by the improvement, and not thrown upon the shoulders of the taxpayers in general, whose benefits are only indirect and not reducible, as in other cases, to a cash basis."

"In the system of assessment of costs upon adjacent property a jury appointed by one of the courts, or special commissioners having in hand the condemnation of the land for street purposes and its appraisal, at the same time fixes the cash value of the benefits that the property facing upon the streets in question secures, as well as the value of the minor benefits to other nearby property. In some instances a fixed percentage of the cost is met out of the general funds." Among the cities which Mayor Davant found to be operating under some form of this system were Charlotte, N. C., Omaha, Cleveland, St. Louis, Milwaukee, Baltimore, Buffalo, Little Rock, Louisville and Harrisburg. In the Pennsylvania law recently enacted, cities can be assessed up to the entire cost of the street improvement, and this appears to be the more general plan pursued. The law makes these assessments a lien upon the property like any other tax. Mayor Davant considers, however, that the public at large should bear some equitable portion of the cost.

In a number of states the growth of cities along orderly lines is provided for by state laws. Louisville, Ky., for instance, has jurisdiction over the laying out of streets and lanes for three miles beyond its corporate limits; Milwaukee, Wis., for one and a half miles; Cleveland, Ohio, for three miles. In Michigan and some other states the consent of the state must be secured before any highway can be opened, and the state official is required to confer with county and city authorities before issuing the required permit.

The following are some of the methods as described in the letters received by Mayor Davant: Louisville, Buffalo, Minneapolis, Des Moines, Indianapolis, Springfield, Mass., Providence, Charleston, W. Va., Portland, Ore., Los Angeles, Pittsburgh, Denver, Tampa, Fla., Milwaukee, Kansas City, Mo., Omaha, Columbia, S. C., and Cleveland require that streets be deeded to the city without any compensation of any kind being paid therefor. Several of these refuse to allow water or sewers or other public conveniences to have connections carried into streets which are not so dedicated, among these being Buffalo, Los Angeles and Baltimore. The California law gives the city and county power to compel all highways, whether dedicated or not, to conform to the adjoining, surrounding or neighboring streets or highways. In Pennsylvania no lot can be sold under the state law unless the plat is accepted by the municipal authorities of the district in which the lot lies. In Milwaukee and Cleveland a proprietor subdividing a land into building lots is required to record the map or plat, and such recording of itself dedicates the streets and alleys to the public without compensation. Under the Tennessee law it is a misdemeanor to sell a lot when the streets and alleys do not conform to the general street system. In St. Louis the entire cost of boulevards, including planting and care of trees, shrubbery, etc., and all other improvements is assessed upon the property owners on the boulevard.

Mayor Davant concluded his message by recommending the appointment by council of a committee on legislation to act in cooperation with the city attorney in securing the support of all Georgia cities for such legislation as would be required to permit them to adopt one or all of the methods referred to in the message.

CONCRETE ROADS VS. FOUNDATIONS

Use of Concrete as a Surface Material Under Heavy Horse and Automobile Traffic—Advantages and Disadvantages—Difficulty of Repairing

By MAJ. W. W. CROSBY.*

For the sake of making clear the statements to follow, let it be assumed primarily that a "Concrete Road" is one in which the artificial surfacing for the roadway is built of a concrete composed of hydraulic cement, sand and gravel or broken stone, all of predetermined proportions, and is *not* covered, or protected from wear, by a carpet or coating of appreciable thickness of pitch and other material. Then all those roadways in which a cement concrete layer is covered by a carpet of pitchy material will naturally fall together into another class where a "concrete base" or "foundation" supports a wearing surface composed of block paving, sheet or rock asphalt, bituminous carpet, etc., and in the consideration of these instances of the use of concrete, the concrete will be referred to as the "concrete foundation." Further, it should probably be understood that in writing the following the author had in mind, when he referred to a road or streets, those public highways on which a considerable amount of animal drawn and of hard tired traffic might be expected along with motor traffic carried on rubber tires. In any case where the road crust is not open to use by an appreciable amount of the former traffic, some of the remarks made might have to be considerably modified.

The use of concrete for both road surfaces and road foundations is not new. Thirty or more years ago the concrete road (in the above described sense of the term) was "discovered," tried out and abandoned. It was found to possess certain inherent defects under the then existing conditions, and these proved so serious that its economical use was found to be limited so as to result in the practical abandonment of this form of surfacing for the time being. With the changed conditions now existing, the use of concrete for roadways has again begun. The increase of traffic has demanded stronger roads. The reduced ratio of horse-drawn to total traffic has changed the average character of the stresses on the surfacing material. The immense reduction in the cost of hydraulic cement and the improvements in machinery for mixing and placing the concrete have aided the latter to compete with other road crusts in first cost and also in long-run costs. And it seems to the writer that under the changed conditions there are at present many cases where existing circumstances—such, for instance, as poor natural foundation for and heavy traffic on the road, or convenience in the supply of materials for concrete—justify or even demand its selection for at least a part of the road crust. On the other hand, the tendency of certain road authorities and others to rush to concrete as a panacea for all road ills is to be deplored as both irrational and extravagant. In these days the great problem for road authorities is the proper selection of the form of construction best suited for the circumstances of any particular case, and a sufficient variety of surfacings, including concrete, is now available to permit true economy to be had by a proper choice.

Of the factors influencing the decision for or against the selection of concrete as the road surfacing may be considered: Cost (first and long-run), Durability, Ease of Maintenance, Cleanliness, Resistance to traction, Slipperiness, Sanitariness, Acceptability, Favorableness to travel.†

*Consulting Engineer of Baltimore, Md.

†See "The Scientific Selection of Pavements," *Municipal Journal*, May 29th, 1913, page 737.

Cost—Only too frequently this consideration is limited to first cost and fails to include, as it should, the interest charges on first cost and the cost of maintaining the pavement in as good condition as when first completed (or a depreciation charge) in order that a fair comparison may be drawn. Concrete can never be as low in first-cost as macadam under the same conditions because of the introduction into the former of cement for which an additional cost has to be met. Ordinarily, though, competition may be had—often successfully—by a proper assumption that a less thickness of concrete will be as strong as the macadam to be prescribed, and further, that it is frequently possible to use in the concrete a local material for the aggregate which may be secured at a smaller cost than necessary for a proper stone for the macadam. A local granite may make an excellent concrete when it would prove entirely unsatisfactory, because of its lack of binding qualities, for macadam; and if macadam were to be built, the cost of importing a suitable stone might offset the additional cost of making concrete from the local granite.

In the same way, where small, sandy gravel is plentiful in a locality and good stone for broken stone macadam is required to be imported at a considerable expense, frequently gravel concrete roads or gravel concrete foundations carrying a bituminous surface will be found to be the economical solution.

Contrary to the arguments of many of the advocates of concrete roads, a concrete surfacing is not permanent in the sense that it will last indefinitely without repair. It is unfortunate that in the advocacy of modern road improvement the use of this word "permanent" has been so indiscriminate. No road surface is permanent. All require repairs from time to time if they are to be kept continuously in good condition, and the use of the word "permanent" in the arguments for better roads has been deceptive. Its abuse has produced disappointment, frequently a reaction against the movement, and often extravagance in later expenditures. It is questionable whether or not the cement manufacturers themselves, to whom many of the arguments for concrete roads may be traced, are working for their best interests in the end by their reference to concrete as "a permanent road" surfacing.

Concrete roads, in addition to the interest charges to be figured in their long-run cost, require continuous expense for maintenance and repair. Except possibly in those cases where a curb adjoins the edges of the concrete roadway, the shoulders (even if the concrete itself does not) begin to need maintenance the day after the completion of the roadway. The usual sudden transition from the rigid concrete to the softer shoulder material produces, under the first heavy vehicle that in passing turns out and off the concrete, a depression or rut along the edge of the concrete. This depression or rut is a vulnerable spot in the armored road and must be immediately protected, by repair, against serious consequences from the entrance of water or from material damage to the edge of the concrete itself. These points of weakness, which also are likely to occur between the earth shoulders and any road surfacing, are, in the case of concrete roads, more frequent and of greater extent, because of the greater difference in rigidity between an earth shoulder and the concrete than between the same kind of shoulder and a gravel road for instance. While the shoulder maintenance may not be a part of the maintenance charges for the concrete itself, it certainly is a part of the road maintenance, especially where, in order to keep the first cost down, the concrete surface has been built too narrow in width to carry on it all the traffic, and a considerable portion of the latter constantly turns out onto the

shoulders. Certain road authorities have seemed frequently to neglect, in deciding widths or character of surface to be built, a proper consideration of the comparison between shoulder maintenance costs and interest charges plus surfacing maintenance costs, with the results of dissatisfaction to the road user and excessive costs in the end to the contributors.

The concrete surfacing itself will, after a period dependent of course on local conditions, require repairs, and it is an inherent difficulty of concrete that repairs to it are not easily made. This fact was one of the main reasons for the abandonment of the earlier efforts to use concrete for road surfaces. While these repairs may seem in some respects relatively slight, the expense for them will be inversely large.

Reliable figures of cost for maintenance of concrete roads are not as yet at hand, but the foregoing may serve to indicate, from the point of view of cost, the factors to be considered in this connection and the points of weakness in some of the arguments that have been advanced for the more general adoption of concrete road surfaces.

Durability—(Ease and infrequency of repair). Reference has been made to the fact that concrete is not easy to repair. The frequency of repair may depend largely on local conditions, but it is also affected by certain peculiarities of any concrete. The mixing together of four different materials and the placing of the resulting mass in the roadway give many opportunities for irregularities to occur. A most desirable feature of any road surface is an ability to wear uniformly, and this is frequently, if not generally, more desirable than a less uniform, even if slower, rate of wear. The difficulties in the way of the necessary high degree of uniformity in cement concrete for road surfaces are apparent when it is recognized that few sources of broken stone deliver a uniform product; that there is frequently considerable variation in the ledge or quarry itself; that there often is variation, even between the products of different days, from the crusher and screens, and that segregation of the smaller from the larger sizes generally occurs in loading, shipping and handling this product. The same may be said as regards the sand in many cases. The quantity of water present in the mixture is frequently more or less irregular and segregation and other causes for non-uniformity generally arise during the mixing and placing of the concrete. All these contribute to the presence so generally noted in concrete road surfaces of spots of unequal abilities to resist wear and to the consequently resulting holes so difficult of proper repair, which form one of the main objections to this type of pavement.

It might be said here that, while proper supervision does reduce to some extent the lack of homogeneity in results, certain inherent irregularities can be reduced only by mechanical means while certain others seem inevitable. For instance the natural irregularity in position of the stone in the surface of the placed concrete may be reduced to a considerable extent by rolling so that, just as in good broken-stone macadam the majority of the larger pieces of stone in the surface will lie with a face exposed to subsequent wear instead of an edge, as is found in most cases of insufficiently rolled macadam. Harrowing a layer of broken stone will result in greater uniformity as to size of the pieces of stone in the surface. Hence there seems to be good ground for some of the claims of the advocates of a concrete road surface formed by grouting the broken stone spread and rolled in place such as in the Hassam pavement. Further, the mechanical bond thus secured between the stone particles is worth considering as an additional factor for strength and durability.

Concrete is not easily repaired so as to be satisfactory. In the first place, the difficulty of remedying a slight depression worn into the surface under traffic generally leads to letting such a defect increase to material dimensions before attempting its repair, which is of course objectionable. To repair any depression with any degree of satisfaction it has been found necessary that the depth of the hole be, or be made, sufficient to provide space for placing in it aggregate of the same size as that which forms the adjoining surfaces and flush with them. Also it is necessary that the new concrete be of uniform thickness, not tapering off at the edges. This means that for the proper repair of a hole the old concrete must be more or less cut away—a rather expensive proceeding. Even then if a good bond—a difficult matter frequently—is not secured between the new and the old concrete, the joints in the surface soon become objectionable. When the ordinary concrete road surface begins to need repair, it is practically only a question of a short time when the concrete surfacing will have to be abandoned as such and turned into a concrete foundation because of the difficulties of repairing the concrete so as to leave it satisfactory as a road surface.

If a concrete road is built of gravel, notwithstanding that the average strength of gravel concrete is greater than with broken stone concrete, the lack of mechanical bond obtainable from the rounded stones in the surface renders the latter particularly susceptible to damage by the shod feet of draught animals. The blow of a horse shoe may break the cementing mortar around a stone and the pushing or twisting of the foot may then easily dislodge the stone from its place. Of course, the adjoining stones are then more easily dislodged and the hole in the surface grows rapidly and needs repair.

The difficulties of proper repair are so well recognized that many engineers are now recommending such work to be done with *bituminous* concrete instead of cement concrete, but of course this is only a step toward the ultimate transformation of the concrete road (surface) into a concrete foundation.

Again, it seems pretty generally agreed that concrete roads are liable to objectionable cracking under the influence of changes in temperature and in the conditions regarding moisture present. After being placed, the wet concrete shrinks considerably in setting and drying, and this change of volume produces cracks in the surface. These cracks form points of weakness and foci of deterioration more or less serious, according to their distribution and concentration. The effort is usually made to concentrate them in regularly occurring joints, and these joints are predeterminedly built in place with cumbersome iron or steel plates which themselves are objectionable to traffic. These expansion joints increase in obnoxiousness as the road gets older and wears down, and ultimately, in order to relieve this feature, if for no other reason, the coating of the whole road with a bituminous or other surface or pavement is necessary. If these expansion joints are not provided in the first place, the concrete road surface develops cracks irregularly under alternate wetness and dryness or heat and cold, and these cracks break away on their edges and ultimately develop into objectionable places in the surface. Apparently the only remedy then is to cover the entire surface with a carpet or pavement. The concrete road then becomes a concrete foundation, and if it can be foreseen that such an end is probably to result within a limited time the writer believes that reasons of economy demand its careful consideration before reaching a decision to attempt the concrete road construction in the first place.

Ease of Maintenance.—Special machinery is not re-

quired for maintaining concrete roads, and in this respect they may have an advantage over such pavements as bituminous concrete and sheet asphalt. Heaters, mixers and unusual tools are not required, nor even steam rollers for at least any but the largest jobs.

Cleanliness.—Concrete pavements are fairly easily kept reasonably clean. They are perhaps less susceptible of dustlessness and thorough cleanliness than is an asphalt surface or the best brick pavement; but, on the other hand, they are more so than macadam or even the ordinary good stone block pavement.

Resistance to Traction.—This is extraordinarily low in the cases of concrete pavements, and few pavements go ahead of them on this point.

Slipperiness.—Concrete pavements are generally more slippery than macadam and stone-block pavements (except in those cases of the latter where the joints are filled with cement mortar) but less so than wood, asphalt, bituminous pavements generally and well laid brick pavements.

Sanitariness.—Concrete pavements are slightly less sanitary than bituminous surfaces and pavements; are equal in this respect to the best laid brick, and are more sanitary than stone block pavements or macadam.

Acceptability—i. e., the bases of personal or local preferences and of aesthetic consideration and of noiselessness. As before referred to, the writer is aware that at present there exists in many minds a prejudice more or less strong toward the selection of concrete for the road surface, regardless of facts. That the propriety of this state of affairs may sometimes be successfully questioned he has attempted to show. As to aesthetic considerations it may be noted that the glaring effect of the mortar in the concrete is frequently objectionable, even when dark-colored stone are used for the aggregate. On the other hand, a light color of the concrete may be beneficial for unlighted roads through woods, especially where there is much travel at night. As to noiselessness, concrete pavements offer slight objections on this account. They are productive of more noise than bituminous surfaces and pavements or macadam but of less than brick or stone blocks.

Favorableness to Travel.—Concrete pavements are somewhat less favorable to travel than macadam or bituminous surfaces and pavements and more favorable than stone blocks or brick in that their surface rigidity lies between the two types mentioned. An extremely rigid inelastic surface is objectionable to passengers over it even when the vehicular devices for lessening the inevitable shocks are of the highest efficiency. Animals naturally prefer the softer materials on which to tread, especially when unaccustomed to metal or paved roads. As the proportion of surfaced to unsurfaced roads increases, the latter objection to concrete is somewhat reduced. Complaints have reached the writer from motorists using newly-completed stretches of concrete roads that an unpleasant vibration was noticeable to the passengers in going over such roads, and it seems probable from the descriptions and the writer's own experiences that such vibration was due to minor unevennesses in the surface, unnoticeable to the eyes or at low speeds. If the speed be high enough, this vibration can be detected on the best concrete roads, though it seems imperceptible on macadam or on good bituminous surfaces and pavements.

Those who lean toward concrete roads (using the term as perhaps it is more loosely and generally now applied) may attempt to meet the objections offered above by the writer to concrete roads under his definition of the term by suggesting, as is frequently done, that the removal of nearly all grounds for objection and a considerable strengthening of the arguments for the more general

use of concrete for roadways may be had by *providing a bituminous surface on the concrete.*

Now this point is the rock on which it appears that so many commanders of the good ship Economy and Efficiency have come to grief. If the concrete layer is finally to be treated as a foundation, why go to the extra expense necessary for even fairly successful use of it as a surfacing? Why make it a 1:2:4 mixture if a 1:3:6 has been so often satisfactory? Why pay for floating and otherwise finishing its surface if this can be just as well avoided by finally surfacing with a bituminous material? Why bother with and pay for unnecessary expansion joints? Foundations seldom have required them.

The reasons for separating the consideration, according to the definitions proposed at the beginning by the writer, he hopes may now be apparent. After all, when a concrete layer is to be covered by a bituminous carpet or by a block pavement, are not the considerations regarding the concrete those old ones of sufficient thickness and strength to enable it to perform its purposes, of its composition with gravel or broken stone as may be desirable for economy in first cost, and generally and identically those of any concrete foundation or base for a road surface? And then, as regards the surfacing layer, are they not the same old ones of character, of thickness, of composition, all to fit best the local conditions?

There certainly is room in the practice of highway engineering for the better and more scientific selection of road crusts. Many are doubtless familiar with instances of good pavements that have satisfactorily survived many years on a cheap gravel or sand foundation with only reasonable charges for maintenance, and as familiar with other cases where economy would evidently have been had from the installation of a concrete foundation in the first place. It really seems to the writer that the far larger part of the consideration concerning concrete roads (using the term in its broadest, and perhaps at present more general, sense) is composed of two main parts: first, as to the advisability of providing a concrete foundation for the surfacing; and, second, the determination of the character, composition and thickness of the latter.

If highway engineers will but regard the facts in the matter calmly and conservatively, the writer feels that time and money will be saved and that their reputation as engineers will be enhanced.

LAYING SIDEWALKS IN WASHINGTON.

One-half of the cost of laying sidewalks in Washington, D. C., is assessed against the abutting property, and ordinarily the commissioners do not order sidewalk construction until they have received a petition from the owners of more than one-half of the frontage along a block. An exception is made, however, where a walk becomes dangerous, the commissioners ordering the work done in such cases without waiting for a petition. The law requires them to advertise for two weeks their intention to lay sidewalks and curbs and, after a hearing, to order the work done when, in their opinion, it is necessary for the public safety, health, comfort and convenience.

During the last fiscal year \$225,000 was expended in paving sidewalks abutting private property, and \$7,000 in placing sidewalks and curbs around government reservations. The sidewalks were constructed of cement by contract. The alleys were paved with asphalt block or vitrified block by day labor, 23,422 square yards of vitrified block and 18,214 square yards of asphalt block, both on a gravel base, having been laid last year. Cement

sidewalks were laid by contract for the following prices: Large jobs adjoining paved streets, 96 cents per square yard; large jobs adjoining unpaved streets and all small jobs, \$1.20 a square yard. Contracts have been let for next year's sidewalk work at 92¾ cents and \$1.16¾, respectively.

WOOD BLOCK IN NEW YORK

Thirty Miles of Heavily Traveled Streets—Four Grades of Lumber, Each Differently Treated—Oil of 1.08 Specific Gravity.

Manhattan Borough, New York City, now has nearly thirty miles of wood block pavement, all of it laid on streets that are among the most important and heavily travelled. Broadway in the lower part of the city is one of the oldest, while more recent ones include Eighth avenue from 13th street to 59th, Broadway from 59th to 74th and Sixth avenue from 42d to 59 street. About five miles were laid this year and an equal amount last year.

The reason for the choice of wood is given in the annual report of Chief Engineer Durham for 1912, as follows: "Wood block has the advantage of asphalt as to smoothness, with greater quiet under horses' hoofs. In wet weather and on grades it presents about the same surface as the latter. When properly laid its life is much longer, but it is almost impossible to restore its surface when once cut to a condition equal to the original."

The traffic of New York streets is probably the heaviest of any city in the world—taking into account the number of streets and the tonnage they carry. At various times the engineers of the highway bureau have taken census of traffic at 165 points. The average of all observations is about 90 tons per foot of street. About two-thirds of the observations were taken on important streets. The following are traffic records for some streets paved with wood block, the figures given being per foot width of roadway per day of ten hours: Broadway, 57th to 58th street, 104 tons per foot; Broadway, 66th to 67th, 160 tons; Eighth avenue, 14th to 15th, 157 tons; same, 23d to 24th, 204 tons; same, 33d to 34th, 200 tons; same,

42d to 43d, 239 tons; same, 58th to 59th, 203 tons; Broadway, Fulton to John street, 171 tons.

The specifications for 1913 for wood block pavement differ in many points from the standard specifications of the American Society of Municipal Improvements. Many of the differences are of minor importance, the principal one being a division of lumber into four grades with a special treatment for each.

According to the Manhattan specifications, the wood used is southern long leaf pine. The blocks are to be cut from prime timber as defined by the Interstate Rules of 1905.

31. The blocks shall average eighty (80%) per cent. heart wood; individual blocks will, however, be accepted that contain fifty (50%) per cent. sap wood, provided timber has been well cured to the extent that sap wood is "live" (not brittle) and of a weight approximately of 42 pounds per cubic foot. Timber as specified shall be properly air dried to the extent that an average sample of the block as manufactured shall not weigh more than fifty (50) pounds per cubic foot.

32. In all timber the annual rings shall average not less than eight (8) per inch measured radially from the heart so as to include the greatest number of rings possible, and in no single inch of this radius shall there be less than six (6) annual rings, provided, however, 5 per cent. of stock will be accepted showing a minimum of five (5) rings.

33. Different lots of timber of varying weights per cubic foot, due to same being more or less thoroughly cured or dried, shall not be manufactured together for the same charge, but as nearly as possible timber weighing from thirty-eight (38) to forty-four (44) pounds per cubic foot; and timber weighing from forty-four (44) to fifty (50) pounds per foot shall be manufactured for separate charges, the object being to separate the blocks for treatment according to their moisture content into charges of which the average weights per cubic foot shall be: 38-42 pounds; 42-44 pounds; 44-46 pounds; and 46-50 pounds per cubic foot.

34. The blocks shall not be less than five (5) inches nor more than nine (9) inches in length; and not less than three (3) inches nor more than four (4) inches in width. The depth of blocks parallel to fibre shall be four (4) inches with an allowable variation of either way not exceeding one-sixteenth (1/16-inch) of an inch. The blocks for any one city block shall not vary more than 1/8 inch either way in width or 1 inch either way in length, but within the limits stated. Adjacent blocks in a course shall not vary more than 1/8 inch in width.

OIL

35. Before treatment is begun a drip sample of the completely liquefied oil shall be taken, commencing after the



LAYING WOOD BLOCK ON DRY MORTAR BED. SIXTH AVENUE, NEW YORK.

oil has started to run freely. Where this can not be done samples shall be taken from various depths of the storage tank.

Samples of oil shall be drawn from each cylinder charge of blocks as treated, and the same tested at the plant as often as deemed advisable.

Additional samples taken from the treating tank during the process of the work shall at no time show an accumulation of more than 2 per cent. of sawdust and dirt or other foreign matter, or more than 3 per cent. of water. Due allowance shall be made for such accumulation of such foreign matter by injecting a corresponding quantity of oil into the blocks.

36. The oil with which the blocks are treated shall be at least 75 per cent. pure coal tar product and shall comply with the following requirements:

(a) The specific gravity shall be not less than 1.08 and not more than 1.12 at 38 degrees C.

(b) It shall contain not more than 3 per cent. of matter insoluble in hot benzol and chloroform.

(c) When subjected to distillation, according to the method described, the amount of distillate based on water free oil shall be as follows:

Up to 200 degrees C., not more than 1 per cent.

Up to 235 degrees C., not more than 20 per cent.

Up to 315 degrees C., not less than 20 per cent. or more than 50 per cent.

The fraction distilling between 235 degrees and 315 degrees C. shall have a gravity of not less than 1.03 at 38 degrees C.

TREATMENT.

39. The treatment shall consist of two factors:

(a) The application of preliminary steam and vacuum.

(b) The injection of a minimum average 18 pounds of oil into each cubic foot of timber. In addition to this minimum average such additional oil shall be injected into the timber, depending on its physical condition, as shall render it possible for the treated blocks to pass an average five (5%) per cent. absorption test as hereinafter specified.

Blocks cut from timber allowed under these specifications require longer or shorter periods of treatment in proportion to its being more or less thoroughly cured to its sap and heart content, and to its pitch content. The following variations in treatment are required for charges of which the averages in weight per cubic foot are to be carefully taken.

40. Timber.—38-42 pounds per cubic foot.—Live steam shall be admitted into the cylinder and applied to the blocks, being gradually raised during a period of one (1) hour to 15 pounds boiler gauge pressure and 250 degrees F., which pressure shall be maintained for 2 hours; then a vacuum of not less than 22 inches shall be applied for 1½ hours, the temperature in cylinder being maintained at not less than 155 degrees F.

Oil at not less than 180 degrees F., nor more than 190 degrees F., shall then be admitted and the pressure gradually raised during a period of three hours to 160 pounds or until an average of 18 pounds of oil has been forced into each cubic foot of blocks. During this period the temperature of the oil shall not be allowed to fall below 165 degrees F. The free oil shall then be expelled from the cylinder.

41. Timber.—42-44 pounds per cubic foot.—Live steam shall be admitted into the cylinder and applied to the blocks, being gradually raised during a period of 1 hour to 18 pounds boiler gauge pressure and 255 degrees F., which pressure shall be maintained for a period of 3 hours; then a vacuum of not less than 23 inches shall be applied for 2 hours, the temperature in cylinder being maintained at not less than 150 degrees F.

Oil at not less than 180 degrees F., nor more than 190 degrees F., shall then be admitted and pressure gradually raised during a period of 3 hours to 165 pounds, or until an average of 18 pounds of oil has been forced into each cubic foot of blocks. During this period the temperature of the oil shall not be allowed to fall below 165 degrees F. The free oil shall then be expelled from the cylinder.

42. Timber.—44-46 pounds per cubic foot.—Live steam shall be admitted into the cylinder and applied to the blocks, being gradually raised during a period of 1 hour to 20 pounds boiler gauge pressure and 259 degrees F., which pressure shall be maintained for not less than 4 hours; then a vacuum of not less than 24 inches shall be applied for 2 hours, the temperature in cylinder being maintained at not less than 140 degrees F.

Oil at not less than 180 degrees F., nor more than 190 degrees F., shall then be admitted and pressure gradually raised during a period of 3½ hours to 165 pounds or until an average of 18 pounds of oil has been forced into each

cubic foot of blocks. During this period the temperature of the oil shall not be allowed to fall below 165 degrees F. The free oil shall then be expelled from the cylinder.

43. Timber.—46-50 pounds per cubic foot.—Live steam shall be admitted into the cylinder and applied to the blocks, being gradually raised during a period of 2 hours to 20 pounds boiler gauge pressure and 259 degrees F., which pressure shall be maintained for not less than 5 hours; then a vacuum of not less than 24 inches shall be applied for 2½ hours, the temperature in cylinder being maintained above 140 degrees F.

Oil at not less than 180 degrees F., nor more than 190 degrees F., shall then be admitted and pressure gradually raised during a period of 3½ hours at 170 pounds, or until an average of 18 pounds of oil has been forced into each cubic foot of blocks. During this period the temperature of the oil shall not be allowed to fall below 165 degrees F. The free oil shall then be expelled from the cylinder.

44. In applying the treatment specified, variations and changes may be made from time to time in duration of treatment and in temperatures and pressures used, to suit various gravities of oil and different varieties of timber. Such may be specified by the engineer, but shall not be continued unless their use is clearly warranted by an improvement in the quality of the blocks manufactured. This shall be demonstrated by tests to be made on samples of each charge treated, as hereinafter specified.

Upon the completion of treatment, charges shall be allowed to remain in cylinders for from thirty minutes to an hour, and shall then be withdrawn. The blocks shall be protected from sun after manufacture, and shall be loaded within forty-eight (48) hours thereafter for shipment.

After delivery (and before laying in the street) the blocks shall show such waterproof qualities that after being dried in an oven at a temperature of 100 degrees F. for a period of twenty-four (24) hours, weighed and then immersed in clean water for a period of twenty-four (24) hours and again weighed, the gain in weight shall be not more than five (5%) per cent.

Blocks are laid on a 6-inch concrete foundation. Over this is spread a bed ½ inch thick of dry Portland cement and sand, mixed 1:4. Two methods of shaping the mortar bed are provided. In one, guide strips of ⅛-inch steel or ¼-inch wood are laid across the street at intervals of 8 or 10 feet and used as guides for a straight-edge in striking off the bed; or the guides may be set parallel with the curb and the bed struck with a template shaped to conform with the crown. The bed is sprinkled in advance of the block laying. The blocks after laying are rolled with a 5-ton roller. The joints are filled with 2:1 cement grout, mixed dry and sprinkled as it is swept into the joints. The pavement is finally covered with half an inch of sand.

WOOD BLOCK PAVING ABROAD.

The chief engineer of the Board of Estimate and Apportionment of New York City, Nelson P. Lewis, was sent as a representative to the Third International Congress in London last summer, and has recently presented to the board his report giving a synopsis of the proceedings of that Congress. We have already published two or three more or less complete synopses, but we believe that the report by Mr. Lewis concerning the discussion of wood block pavements has not yet been covered by us. Among other things to be noted is that Great Britain, where the hard Australian woods were first used, now prefers soft wood preserved with creosote, and that in France the blocks are merely dipped in oil or tar and the penetration is very superficial. Mr. Lewis' report is as follows:

The practice of laying wood block pavement in France, Great Britain and the United States has become quite well standardized, and the important points covered by the reporters from these countries will be considered together.

As between hard and soft woods, the reporters from all three countries express a preference for the soft wood, although the reporter from Great Britain refers to exceedingly satisfactory results lately obtained in Hampstead by the use of a sectional hardwood block. This is a block of about ordinary size, but made of a number of smaller

blocks fastened together and held in proper position with respect to each other by strips rabbeted into the sides of the composite block. The word soft wood is intended to apply to woods like our American yellow pine, larch, tamarack, the French and English pines, and Norwegian deal, while the term hard wood refers to such woods as karri, jarrah, red gum and blackbutt.

Depth of Block.—The reporter from the United States gives $3\frac{1}{2}$ inches as the standard depth, the British reporter 5 inches, and the French reporter 5 inches.

It will be noted that the European practice is to use a deeper block than is customary in New York, and while it is true that the pine in use in the United States is somewhat harder and is more thoroughly treated than that used in Great Britain or France, the practice of using the deeper block appears to be better.

Kind of Preservative.—In the United States the usual preservative is coal gas, water gas or coke oven tar, with the coal gas tar in more general use. In Great Britain creosote is generally used, and in France a similar material. As to the amount of impregnating oil:—in the United States from 14 to 20 pounds per cubic foot is injected; in Great Britain the usual practice is 10 pounds per cubic foot; in France the blocks are merely "pickled" or steeped in oil, the penetration being very superficial.

Cushion Coat.—In the United States a cushion coat is quite generally used, although there is lately a disposition to place the blocks directly on a concrete foundation rendered smooth by a coat of cement mortar. In Great Britain and in France the omission of the sand cushion is quite general. Inasmuch as the use of the sand cushion is a survival from the time when stone blocks were almost universally used, and as its purpose was to allow for variations in the depth of the block used and to take up the shock of traffic, and inasmuch as wood blocks are cut to a uniform depth and are sufficiently elastic to absorb the shock, the omission of the sand cushion seems rational.

Expansion Joints.—The practice in all of the three countries referred to is to use expansion joints along the curb.

Life and Annual Cost of Repairs.—In France the average life of a wooden block pavement is given as from 6 to 9 years, and the annual cost of maintenance as 2c. per square yard. In Great Britain the life of the pavement is estimated at from 10 to 15 years, while the annual cost of maintenance varies from 2c. to 20c. a square yard, according to conditions. In the United States modern wood pavements have been used for so short a time that it is difficult to make an intelligent estimate of their life but the opinion that they will last for twenty years under a moderate traffic seems to be justified, while the annual cost of repairs under a light traffic has been estimated to be as little as 2c. a square yard per annum and under heavy traffic not more than 7c. or 8c. a square yard.

The conclusions embodied in the resolutions adopted by the Congress were as follows:

1. Where gradients permit, wood block pavement is very suitable for streets where the traffic is great but is not of the exceptionally heavy character usually existing on streets near docks or similar centers of industrial traffic. It should be used where a noiseless pavement is desirable.

It is of great importance that a concrete foundation should be laid of sufficient strength to carry the traffic passing over the pavement.

2. Great care is necessary in the selection of the proper timber for the purpose, and all soft wood blocks should be thoroughly impregnated with a well proved preservative before being laid.

3. In view of the varying results given by wood pavements, according to local circumstances, it is desirable that further investigations and laboratory experiments should be carried out in connection with the selection of the timber and of the impregnating preservative.

4. Every precaution should be taken in laying the blocks to prevent, so far as possible, the entry of water through the joints.

4a. Hard woods give varying results according to local circumstances, and it does not appear desirable to recommend them for roads with intense traffic in large cities, unless some means are devised to effectively prevent the rapid destruction of the joints and the resulting destructive effect on the concrete below. If these woods are employed it is desirable not only to prevent the percolation of water through the joints to the foundation, but also to consolidate the blocks as far as possible, so that they may not become rounded at the edges.

Soft woods obtained from suitable kinds of trees, and especially from resinous species, are equally suitable for roads with a comparatively heavy and intense traffic as well as for roads with a light and infrequent traffic. In

the latter, however, the blocks are liable to rot if they have not been suitably pickled. It is also desirable to make the joints as small and watertight as possible. On the other hand, their comparatively rapid wear on roads with great traffic should encourage one to make exhaustive investigations into the best means of treating them, so as to increase their strength without prejudice to their elasticity.

5. Subject to certain precautions, such as impregnating of the wood, waterproofing of the joints and surface, frequent cleaning of the roadway, etc., there is no objection to wood pavement from a sanitary point of view.

6. The spreading of gritting is necessary under certain conditions and in certain weather (especially on hard road paving) to prevent the surface becoming slippery, but the gritting should be done with suitable small gravel chip-pings, or sharp sand, so as to avoid as far as possible any injury to rubber tires.

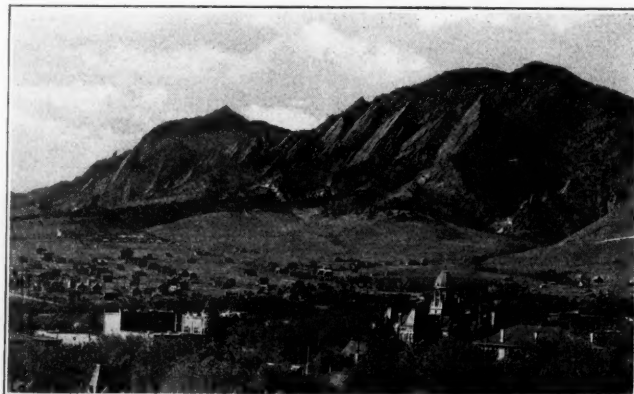
BOULDER'S MUNICIPAL PARK.

By EUGENE WILDER.

A park, known as Griffith Park, which was donated to the city by one of its public-spirited citizens, was recently stated by a Los Angeles paper to be the second largest in the world, its area being 3,015 acres. Recently this park has been improved by the construction of a Greek stadium capable of seating 20,000 to 30,000 people. This article gave the largest parks of the world as follows: Copenhagen, Denmark, 4,200 acres; Los Angeles, 3,015 acres; Fairmount Park, Philadelphia, 2,816 acres; Prater, Vienna, 2,300 acres; Bois de Bologne, Paris, 2,100 acres; Phoenix, Dublin, 1,760 acres; Forest, St. Louis, 1,392 acres; Royal, Munich, 1,200 acres; Golden Gate, San Francisco, 1,040 acres; Central, New York City, 864 acres; Regent, London, 450 acres.

The editor of this paper was apparently ignorant of the existence of a public park larger than any of these save that of Copenhagen, comprising 3,457 acres lying on the eastern face of the Rocky Mountains, containing a peak which rises 2,000 feet above the city, or 7,400 feet above sea level, and another peak 1,200 feet higher, there being in addition deep canyons, grassy slopes and brooks. This park is just outside of the city of Boulder, Colo., and from the top of the peaks in this park can be seen not only this city but Longmont, sixteen miles away, a number of mining towns a somewhat less distance off, and finally the city of Denver, thirty miles away. To the west are seen the snowy range of the Rocky Mountains and twenty miles away the Arapahoe glacier which supplies the city with water. One peak is accessible by an automobile road and the other by pony trail.

This park has been improved with an ornamental gateway near the street car line leading from the city, and the grounds at the foot of the peaks are laid out with gravel walks, flower beds and well-kept lawns. A large auditorium has been built here with a seating capacity



BOULDER'S PARK. PART OF BOULDER IN THE FOREGROUND.

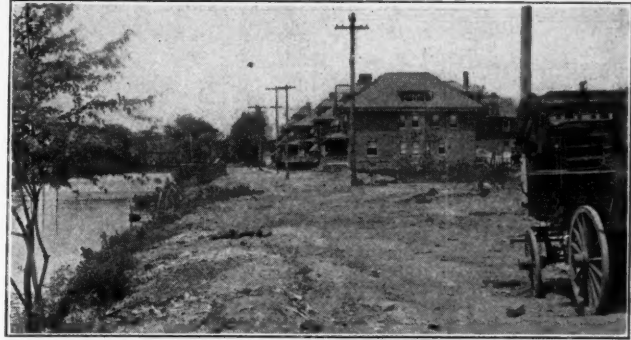
of 5,000. The Texas-Colorado Chautauqua Association leases 80 acres of the park for three months each year for its meetings. In the lower portion of the park is a large enclosure where a number of deer and elk are kept. The entire park is the property of the city of Boulder.

IMPROVING A RIVER BANK STREET

Reinforced Concrete Retaining Wall, Grading, Widening and Paving of Street—Detail of Wall Construction

The city of Trenton, N. J., has recently improved the street known as Riverside avenue, which follows immediately adjacent to a stream, and which serves as an excellent illustration of the vast improvement which can be made at comparatively small cost in situations of this kind. The street had been graded up several feet by filling in the ordinary manner, which filling had been left so rough as to be hardly passable. In spite of this condition, a good class of houses had been constructed because of the otherwise advantageous location. The improvement consisted in constructing a river wall which, without narrowing the waterway of the stream, allowed a considerable widening of the available roadway. The street was then carefully graded for a distance of three blocks. As the ground there is practically level, the elevation of Riverside avenue at three consecutive intersecting streets was made exactly the same. The distances between these streets was about 240 feet, and the gutters were given a summit midway between each two streets, with a grade of .004 in each direction. This made a difference in elevation of only 5 inches between the highest and lowest parts of the street. The top of the retaining wall was carried uniformly level throughout, and 6 inches higher than the gutter at the highest points. The pavement which was laid upon the improved grade, consisted of a bituminous surface on a 4-inch concrete base.

The retaining wall is of the inverted T type and was constructed of reinforced concrete. On the coping of



RIVERSIDE AVENUE BEFORE IMPROVEMENT.

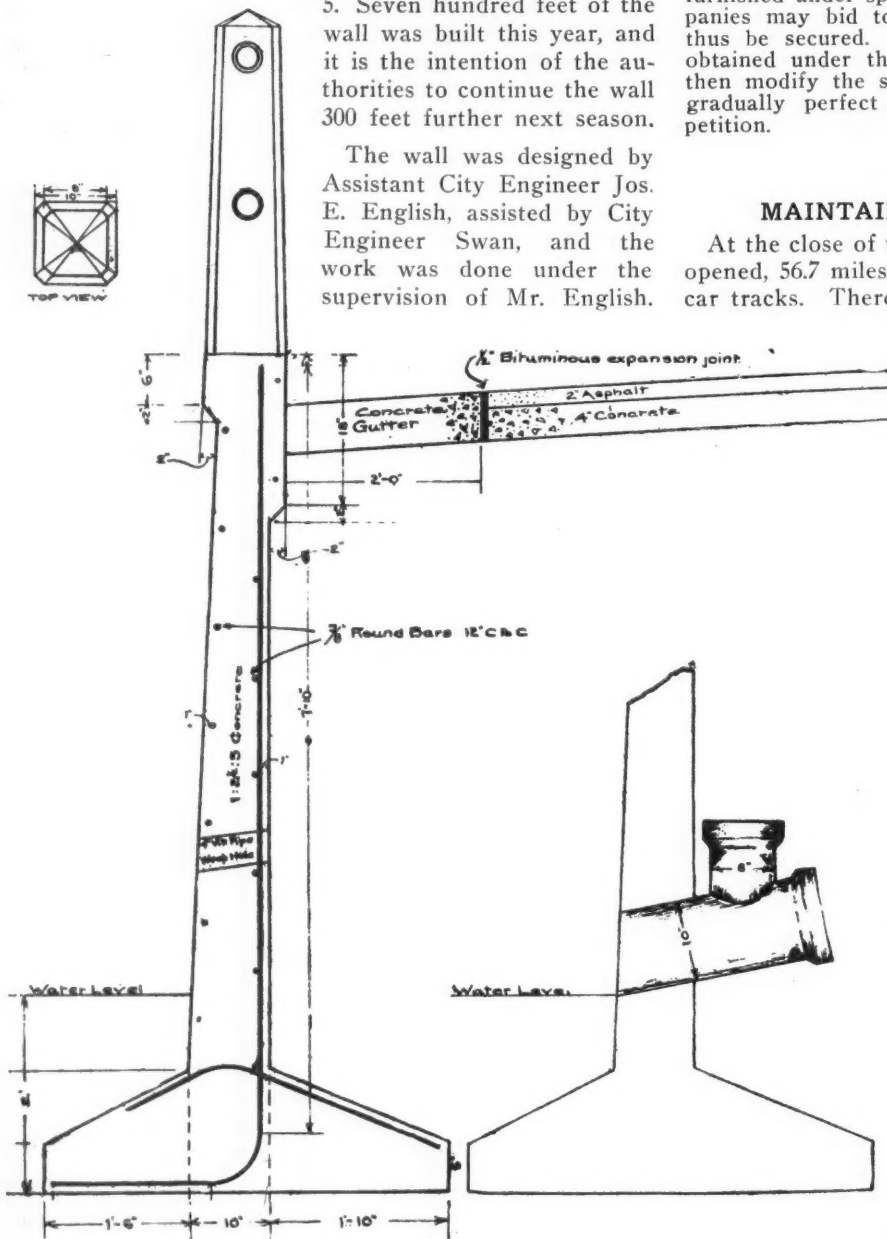
this wall is a railing composed of posts spaced at 8-foot intervals, these posts also being of concrete and each being anchored to the wall by two $\frac{3}{8}$ -inch rods 3 feet long. These posts were connected by two lines of $2\frac{1}{2}$ -inch galvanized wrought iron pipe, one 18 inches and the other 36 inches above the coping. The wall itself is 8 feet 6 inches high from the foundation, or 6 feet 6 inches above water level. The general construction is shown by the accompanying section. The vertical reinforcing rods were of $\frac{3}{8}$ -inch round bars spaced 5 inches between centres, half of them running to the top of the wall and the other half to a point 4 feet 6 inches above the foundation, alternating. These bars were spaced one inch from the back of the wall. The longitudinal reinforcing bars were of $\frac{3}{8}$ -inch round steel and were spaced 12 inches between centres, alternating between the front and back of the wall and placed one inch beneath the surface in each case. In addition, the base was reinforced by rods 3 feet 6 inches long, which were bent cold to conform to the shape of the upper faces of the base. This base was 4 feet 2 inches wide, 6 inches thick at the inner and outer edges, and 15 inches thick at the centre. All intersections of reinforcing bars were wired together. Weep holes of 4-inch vitrified pipe were placed at intervals of 25 feet, located approximately 18 inches above water level. In addition, Y branches were inserted



COMPLETED IMPROVEMENT ON RIVERSIDE AVENUE, TRENTON.

through the wall at water level opposite the curb lines of each intersecting street. The wall proper had a thickness of 10 inches at the base, was vertical on the back and battered to 6 inches just below the coping. The coping had a width of 10 inches and a depth on the face of the wall of 6 inches, and on the rear of the wall of 18 inches. The wall was provided with contraction joints at intervals of 100 feet. The concrete was mixed 1, 2½ and 5. Seven hundred feet of the wall was built this year, and it is the intention of the authorities to continue the wall 300 feet further next season.

The wall was designed by Assistant City Engineer Jos. E. English, assisted by City Engineer Swan, and the work was done under the supervision of Mr. English.



SECTION OF WALL AND PART OF STREET PAVING.

EXPERIMENTAL ROADS AND PAVEMENTS.

Editor Municipal Journal,
New York City, N. Y.

Sir:

In almost every issue of periodicals which give space to articles on highway construction we find details of this or that experimental highway. I often wonder how many of such experimental stretches have been built principally to enable some enterprising individual to bring himself into the "limelight," first in a description of the construction of said experimental highway and later in a description of the condition of said experimental highway after blank months of existence. The material man, too, sometimes has an opportunity to work up an advertisement for his material.

An endeavor to gain information or add to the stock of information about highways or materials desirable for use

in highway construction is laudable if such information is likely to conduce to the general benefit; but I am unable to see just what the general public or the taxpayer is to gain by endless experiments in which, for instance, some patented asphalt or tar preparation is used as a binder in road work. If the experimenter discovers, or thinks he discovers, that some one patented brand of asphalt, tar or other material is superior to the rest, does he intend to confine himself to its use? If not, then why the experiment?

Experiments to be of value should be with materials furnished under specifications so drawn that different companies may bid to furnish the material, and competition thus be secured. If experience shows that the material obtained under the specifications drawn is not the best, then modify the specifications for the next test and thus gradually perfect specifications which will permit competition.

Yours very truly,

T. WARREN ALLEN.

MAINTAINING ERIE'S PAVEMENTS.

At the close of the fiscal year Erie, Pa., had 129 streets opened, 56.7 miles paved and 14.3 miles containing street car tracks. There were 714,158 square yards of asphalt pavement. General repairs to 208,565 square yards of this during the year cost \$10,437, and annual payments on a ten-year guarantee cost \$177. There were 410,770 square yards of brick pavement. General repairs to 170,401 square yards cost \$806; annual payments on a ten-year guarantee cost \$208, and maintaining and renewing brick pavement cost \$4,361. The city maintained the asphalt pavement at about 5 cents per square yard and the brick pavement at 0.47 cent per square yard. The city also has 12,986 square yards of asphalt block and 878 square yards of creosoted wood block on which no maintenance work was done during the year.

The municipal asphalt paving plant spent during the year \$15,445, had in hand at the beginning of the year \$619 worth of stock, and at the end of the year under consideration \$1,465 worth of stock. The principal purchases during the year were as follows: 25 cars of lake sand, \$775; 12 carloads of crushed stone, \$750; 252 yards of washed gravel, \$274; 84 tons of limestone dust, \$147; 276 tons of asphalt, \$6,232 (at prices varying from \$20.50 for Texaco to \$22.80 for Trinidad); 11,657 gallons of fuel oil, \$448; 2,286 gallons of flux oil, \$82; brick for brick gutters, \$466; foreman and labor, \$4,190; teaming, \$1,412; repairs and depreciation on plant, \$1,501.

About 26 tons of asphalt was sold to contractors for \$506.75. The total cost of all material used was \$14,599, of which \$4,162 worth was used on cuts and breaks in asphalt pavements, sewers, etc., leaving \$10,437 spent in repairing asphalt pavement, the amount repaired being 17,314½ square yards. This gives 60.3 cents per square yard, including new brick gutters.

The city plant owns four first-class dump wagons, also wagons used in repairing sewers, etc., but has to hire the horses, and spent in this a total of \$1,660 during the year, which represents 640 team-days. The city engineer believes that it would be a great saving to the city to own a number of teams.

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JANUARY 1, 1914.

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Highway Conventions.

This year, as last, saw two highway conventions which were called national, but at which at least one-half of the attendance consisted of highway engineers, officials and contractors who lived within a few hundred miles of the convention city. At the Philadelphia convention a resolution was passed stating it to be the opinion of the convention that all national road organizations should unite in one convention hereafter. At first thought this union seems desirable as doing away with unnecessary duplication of effort; but there are arguments in favor of just the opposite, viz., increasing still more the number of conventions, but scattering these over the country, probably at at least four or five geographical centres of road activity.

These conventions consist chiefly of reading and discussion of papers and exhibits. The former are generally reviews of progress or descriptions of original work or methods, and there would seem to be no difficulty in obtaining sufficient papers for all of the meetings in question; nor objection to having the same paper, if important enough, read and discussed at all of the meetings. As to the exhibits, it may not have been known or realized by the signers of the Philadelphia

resolution that there have been during the year many exhibits at state and interstate meetings which were better than those at either Detroit or Philadelphia. Such conventions were those of the Appalachian Association, another located on the Pacific coast, etc. At the state fair at Wisconsin last fall there was a far better exhibition of heavy road building machinery than at Philadelphia, and the state fair at Columbus, Ohio, had a notable exhibit; and it is probable that the same could be said of many more state fairs.

The expense of this multiplicity of exhibits may be objectionable to some manufacturers, but on the other hand it gives them opportunity to reach a much larger number of possible purchasers than could be expected to attend one or two national conventions. There are in Wisconsin more than 100 road building outfits of considerable size, purchased by local officials, most of whom probably attend state fairs and would attend local road meetings, but never national conventions.

Would it not better serve all interests to combine the two national societies into one organization, but to establish local branches of this throughout the country, each branch to have its annual meeting, with papers and exhibits?

For Improved Highway Methods.

The American Highway Association and the American Bar Association have appointed a joint committee to take such action as may be necessary to bring about as quickly as is practicable a greater or less degree of uniformity in highway laws and highway control. Among the ideas being considered is the proposition that the state official in direct charge of roads be appointed by non-partisan boards instead of being elected, and for a period to be determined by his usefulness; that the civil service system apply to all minor officials; that road taxes be collected in cash instead of being worked out by farmers, and that the general control of roads be vested in the state rather than in local authorities. These may be stated as the basic principles which will be recommended for enactment into law by all the states. In addition, the committee is completing a compilation of all laws on the subject of roads, with the idea of comparing these and then, we understand, of eliminating those which appear inherently objectionable, and recommending that the states adopt, of the selected alternatives, those which appear best suited to their local conditions and needs.

There would seem to be no probability of dispute concerning the correctness of the basic principles referred to. Some of these, such as the elimination of working out road taxes, have already been quite generally adopted, while of others the need is felt in many quarters, such as the appointing of expert men for direct control of state road work (it is now a generally recognized fact that experts cannot properly be selected by popular vote), that state highway boards should be entirely removed from politics, and that minor officials should be protected by civil service. The desirability of having all roads under state control will not perhaps be so readily assented to by everyone, since there are many arguments in favor of local control of local highways.

Altogether, it is to be hoped that some such action as that contemplated by this committee will materialize quickly into general legislation. The construction of state highways has grown by such rapid strides, from practically nothing to tens of millions a year, that it is hardly to be expected that many mistakes have not been made and that a considerable part of these sums could not be spent to better advantage under improved methods.

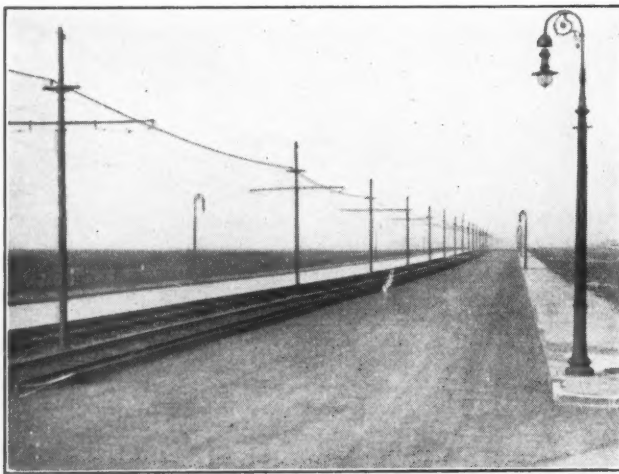
The WEEK'S NEWS

Plank Road in New Jersey—Success of Municipal Paving Plant—Sewer Work Completed—Water Famine in Montreal—Wireless Installed on Fire Boat—New Automatic Fire Escape—Commission Government Progress—Springfield's (Mass.) Municipal Group.

ROADS AND PAVEMENTS

Plank Road Dedicated.

Newark, N. J.—The improved Plank road between Newark and Jersey City has been formally opened and dedicated as the Essex-Hudson Lincoln highway. Under its new name the road will form the Eastern terminus of the proposed National Lincoln highway which is being planned to connect New York and San Francisco. Almost 1,000 vehicles of every description participated in the parade



Courtesy Newark News.

PLANK ROAD.

which featured the celebration. Arrangements for the dedication celebration were completed by a committee headed by Freeholder R. F. Mattia and G. W. Caparn. Congratulatory addresses were made by Commissioner Stevens, Mayor Haussling, Hudson County Supervisor J. F. O'Melia, Director A. Evans, of Essex, and Freeholder T. J. Prior, of Hudson. Others who spoke were President A. V. Hamburg, of the local Board of Trade, and T. J. Wasser, Hudson County engineer, who paid tribute to the foresight of Consulting County Engineer Owen, of Essex County, who conceived the plans and supervised the construction of the road. Over \$1,300,000 has been expended on the work of constructing Plank Road, including the money spent for the construction of two new bridges, one over the Passaic and the other over the Hackensack River. The grade of the road has been raised from six to fourteen feet above the normal road and the surface widened from twenty-six feet, the original width, to 100 feet. This is taken up by two sidewalks, each ten feet in width, and two driveways, twenty-eight feet wide, the south drive being paved with grouted granite block, the north with wood block. In the centre is a twenty-four-foot reservation for trolley cars. The grade of this is about twelve inches above the normal grade of the drives.

Richmond's Record Year.

Richmond, Va.—Supervised by City Engineer Charles and the city engineering department, more work on the streets, alleys and sidewalks has been done under contract last year than ever before in the city's history. Improvements under contract will approximate \$140,000 or \$20,000 more than the largest amount in any previous year, which was \$120,574.71 in 1911. The addition of a mile and a quarter of paved streets brought the total of bricked streets to 4.55 miles. There are 21.64 miles of macadam roadway, 1.13 miles of which was added during

1913. Although three-quarters of a mile of highway has been improved with gravel the total mileage of gravel streets shows a decrease. As rapidly as possible the engineering department is substituting brick and macadam for gravel, which constitutes 27.64 miles of the city's streets. The total number of miles of improved streets according to figures compiled for last year is 68.11. During 1913, 4,155 miles of sewers have been laid which gives the city a sewer system 47.34 miles in length. Four miles of cement curbs and gutters constructed this year bring the total to 39 miles. Last summer \$1,586.93 was spent oiling the streets.

Has Paved Majority of City Streets.

Pasadena, Cal.—This city now has 122.85 miles of paved streets, while there are only 156 miles of streets in the entire city. This shows that all but 33.15 miles of streets within the city limits are paved. Since July 1, 1913, the city has paved and accepted from contractors over 7.6 miles of paving most of which was of the asphalt-concrete, asphalt, macadam or sheet asphalt type. This is the largest amount of paving that has ever been accepted in any six months in the city's history.

Municipal Paving Plant Reduces Cost.

Niagara Falls, N. Y.—City Engineer Parkhurst has submitted to the board of public works a detailed report of the work of the asphalt paving repair plant for 1913. The plant was put in operation last May and was in almost continuous operation until last September 27th. The report states that the plant has given two years of very satisfactory service and will be able to last another year, but will be worthless in 1915. The engineer recommends that a permanent plant be provided for in the next budget at a cost of not more than \$5,000. The plant as it stands today inventories at \$1,003.66. During the year it laid 17,363.69 square yards of topping at a total cost of \$12,369.38 and 1,008 square yards of binder at a total cost of \$664.41. The average cost for both per square yard was 74 cents. The cost of repairing the sheet asphalt topping with the municipal plant has decreased the cost of such repairs by contract 44.8 per cent. The direct saving to the city by the plant in the last two years is \$18,890.59, during which time 29,607.59 square yards have been repaired at a cost of \$21,783.59. At the regular contract price this would have cost the city \$39,674.17.

Construct 112 Concrete Crossings.

Williamsport, Pa.—Nearly twelve thousand square feet of concrete crossings were constructed by the Highway Department last summer. The work for the winter ended in so far as the construction of crossings and approaches is concerned. Working under the direction of Street Commissioner William Marsh, the city crew built 112 crossings in all sections of the city during last spring, summer and fall and only the coming of winter and cold weather stopped the work.

Force Account System Saves Paving Expenses.

Billings, Mont.—The new force account system of paving the streets of Billings has reduced the cost of material and labor an average amount of from 16.3 cents per foot to 12.75 cents, according to a report made to the City Council by Clerk Torrence. The city clerk compared the cost of paving just nearing completion in the city to the cost of previous contracts which he said were completed at an expense to taxpayers of from 13.6 cents per foot to 18.5 cents. The recent jobs, declared Mr. Torrence, have not averaged above 12.75 cents per foot. Under the force account system the

city attends to all the details, such as buying of material and hiring of labor.

Half Million for Streets.

Nashville, Tenn.—Necessitating a total expenditure of about half a million dollars, thirty-three measures providing for the improvement of certain streets under the abutting property tax provisions of the city charter have been introduced in the board of city commissioners by Commissioner J. M. Wilkerson, seventeen of these measures having been passed on second reading and twenty-six of them on first reading. All of the streets to be improved under the pending measures will be built under a five-year guarantee, which will be exacted of the contractors to whom contracts for the improvement of the streets shall be awarded. Contractors will be required to bid not only on the work of building the streets, but also to submit a separate bid on the maintenance of the streets for a period of five years.

Highway Bond Issues in Texas Increase.

Fort Worth, Tex.—More money was appropriated by bond issues for highway building and maintenance in Texas during November than for any other single month since the law permitting that system of financing went into effect. According to data collected nine elections were held in as many Texas counties in November, and five carried by large majorities. Of the four defeated issues, two secured a majority vote, but failed to obtain two-thirds of the ballots cast, as required by law. The total amount of road and bridge bonds voted on during November was \$1,719,000. and of this amount \$1,265,000 carried. The defeated issues total \$454,000.

Free Courses in Highway Construction.

Cleveland, Ohio.—From Jan. 19 to Jan. 31 the department of civil engineering, Case School of Applied Science, Cleveland, will offer a course in highway construction for engineers, contractors, inspectors, prospective applicants for positions in the state highway service and any others who may be interested in this line of work. The course will be given in the form of forenoon lectures covering general highway economics, the various types of highways, their construction and maintenance; afternoon lectures and laboratory work in the materials of construction including cement, concrete, paving brick, crushed stone and other materials; and conferences for the discussion of costs and methods of construction and maintenance. Additional lectures will be given on the subject of culverts and bridges.

"Move-on" Ordinance Effective.

Dallas, Tex.—The "move-on" ordinance is operating with splendid results. It has been enforced strictly, and only a few instances of violation have been reported. The owners of cars, whose numbers were reported by officers as having remained longer than twenty minutes at one place on the three streets specified, will be charged in court with violation of the traffic ordinance. The three streets named are almost free of vehicle congestion along the curbs during the day. The cross streets, however are lined with vehicles. Chief of Police Ryan said that automobile drivers and drivers of other vehicles manifest quite a spirit of co-operation.

Suggest Concrete Roads.

Muncie, Ind.—According to the opinion of Chairman O. E. Weller and Engineer Shirley of the Maryland State Roads Commission the solution of the road problem lies in the concrete road. The commission is experimenting very extensively with this type of road and thus far the experiment has proved successful.

SEWERAGE AND SANITATION

Finish Large Sewer System.

St. Joseph, Mo.—Members of the board of public works have inspected the lower Whitehead sewer, which has just been completed, and which is said to be one of the largest sewers in the country, having a diameter of eighteen feet. This section of the sewer is 310 feet long and extends 210 feet east of Sixth street and forty feet to the west, being far enough west to permit of any necessary street improve-

ment. The sewer is of reinforced concrete. The headwalls, reinforced with 12,000 pounds of steel, are sufficiently strong to withstand a very heavy rush of water.

Trunk Sewer Completed.

Eugene, Ore.—Eugene's new trunk sewer, over five miles long, which has taken over 14 months to construct, at a cost of nearly \$200,000, has been formally accepted by the Council. This big sewer extends from the extreme eastern end of the city, at the foot of the Fairmount Hills, to the Willamette River, in the northwestern part of Eugene. The size of the conduit ranges from 90 inches to 18 inches in diameter. Besides the main sewer, many miles of lateral sewers were built last year. The old system in use for many years will be soon connected with the new trunk.

Fast Work on Sewer.

El Paso, Tex.—One hundred and fifty feet of sewer trench dug and pipe laid, was the record made in one day by the workmen who are laying the deep sewer of this city. The trench is seven feet in width and 15 feet deep. Three pumps are kept on the job and the water is giving but little trouble. While one pump is being moved to another part, the other two are kept working and no time is lost.

Health Campaign Successful.

Tuscaloosa, Ala.—The health campaign which has been conducted in Tuscaloosa county for the past ten weeks under the direction of the state department of health, has come to a close and a new record for the state was established in the fight now being made on the hookworm. During the campaign 4,604 people were examined and 1,120 were found to be infected and received treatment. The largest number ever examined in any previous county campaign was 3,113, in Walker county. One of the surprising features of the campaign was the large number of students and city people found to be infected. An examination was made of most of the school children and university students and the percentage of infection was almost as high as in the rural districts.

Gets Five Miles of Sewers.

Idaho Falls, Ida.—City Sewer Inspector A. R. Parker has announced that he had finished the work of the extension to the sewer system which has been under way for several months and has cost the city \$61,739.55. This means that five miles of sewers have been laid. This extension gives the city of Idaho Falls a very complete sewer system.

WATER SUPPLY

San Francisco's High Water Pressure System.

San Francisco, Cal.—Better fire protection for the entire wholesale and retail district, known as the "Lower zone," has been assured with the cutting in of the last link of San Francisco's high pressure fire fighting system thus far installed, the Jones street reservoir. This completes the harnessing of the 72.5 miles of pipe now underground, and will insure a pressure from this reservoir alone of 160 pounds. The Jones street reservoir, the largest reinforced concrete tank in the city, has a capacity of 750,000 gallons. It was but recently completed and stood the most rigid tests before it was accepted and placed into service. It is located 339 feet above the area for which it will afford protection. Should there now occur in the retail or wholesale district a fire of such proportions that the high pressure system were necessary, the Jones street reservoir would immediately be switched in. If this proved inadequate, a code signal would be sent in, gates leading to the Ashbury reservoir at Ashbury and Carmel streets would be opened, and the pressure would at once leap to 220 pounds. Should this, in turn, prove insufficient, the Ashbury reservoir keeper would open gates leading to the Twin Peaks reservoir, and the entire system would be in play, throwing the enormous pressure of 330 pounds through the connected lines of hose. There are now in use 884 hydrants, or 2,005 valves, in the high pressure system. Extensions have been recently recommended by Fire Chief T. R. Murphy in the districts outside the fire limits. These districts contain many wooden structures and are known as "dangerous." Shortly there will also be completed an extension of the system that will take in the entire site of the Panama-Pacific Exposition.

Large Water System Near Completion.

Raleigh, N. C.—The commissioners expect to have Raleigh's practically new water system completed and in operation by March 1st, including the 250,000,000-gallon water basin, now under way, which is to cover 110 acres. The city is spending \$100,000 in rehabilitating the municipal plant purchased from the Wake Water Co. The installation of a complete filtration apparatus will make possible an entirely pure water supply.

Water Famine Alarms Montreal.

Montreal, Quebec.—The civic water supply, upon which four-fifths of the 600,000 inhabitants of this city depend, has been cut off entirely through the bursting of the sole source of water supply—a simple concrete main leading from the St. Lawrence River intake to the city proper. The aqueduct, which was built two years ago at an expense of \$750,000, was not strong enough to stand the strain of the pressure and has been threatening to break down for several weeks past. It is reported that the civic authorities were fully cognizant of this condition but failed to inform the Civic Water Committee. The Montreal Water and Power Company, which supplies about one-sixth of the city, has placed its surplus resources at the disposal of the authorities. However, this surplus only amounts to 15,000,000 gallons a day, whereas the city's normal consumption requires about 45,000,000 gallons a day. The city has sent out its summer water carts with free supplies. Water from the St. Lawrence River was sold by enterprising carters at \$1.25 per cask, plus cartage charges, amounting to from \$1 to \$5. The hospitals were deprived of water and have therefore been obliged to stop their heating apparatus and suspend operations. For the same reason several manufacturing plants and office buildings have had to close. It is estimated that from six to twenty days will be required to mend the aqueduct.

Economy of Meter System.

Franklin, Pa.—A campaign for the installation of the meter system as the solution of Franklin's water problem has been initiated at a meeting of the city commission. Supt. H. Ellsworth, of the water and lighting department of Meadville said that under the meter system 50 per cent less water is used than under the non-metered system. In Meadville the installation of meters has grown gradually, their use being optional. The people have found meters to their advantage: they save money and they are a benefit to the city. During the past seven years the number of taps has increased 23 per cent and the meters have increased 130 per cent. At present the city is 68 per cent metered and the city commission at its latest meeting instructed the city solicitor to prepare a compulsory meter ordinance. The old argument that the water plant would not be self-sustaining under the meter system has not held good in Meadville. During the seven years the gross earnings increased 15 per cent and the net earnings 12 per cent.

Continued Dry Spell in Petersburg, Va.

Petersburg, Va.—The continued dry spell which has prevailed in this section for the past two years or more is making the city's supply of water one of serious concern. The water in the city's reservoir has been only seven feet in depth, while the normal level is about twenty feet. City Engineer Budd is hoping that early winter rains will be sufficient to carry the city through until the new cross-town main is completed. In the event, however, of a big fire, the city's reservoir would be emptied in a very short time and the loss in some parts of the city on account of the low water pressure would evidently result in heavy losses. The Appomattox at this point is extremely low, and where there would ordinarily be several feet of water teamsters are now hauling away sand in great quantities.

STREET LIGHTING AND POWER

Question Authority of Commission to Lower Rates.

Charleston, W. Va.—The natural gas companies operating in West Virginia have secured a temporary restraining order from the Supreme Court of the State enjoining the West Virginia Public Service commission from putting in effect the new rate of 22 cents a thousand cubic feet for

natural gas to private consumers, fixed by the commission some weeks ago, when it held a higher rate to be excessive. The suit in which the order was granted, questions the authority of the commission to fix rates for sale of gas. This is the first time the authority of the commission has been questioned in the courts since its establishment.

Install Lighting System.

Bangor, Me.—The new Main street lighting system installed through the efforts of the Chamber of Commerce has been put into operation. The result is all that was anticipated and particularly pleasing to those who have been active in securing the adoption of the new lighting system on the street. The entire length of Main street presented a brilliant appearance, the like of which has never been seen in this city before. The bright arc lights that have been installed on each of the ornamental poles gives a clear, steady white light.

Lower Lighting Rates.

Ocala, Fla.—The city council at the regular meeting has made sweeping reductions in the rate of both light and water. Electricity for lighting was reduced from 8 cents per kilowatt to 6 cents, and the minimum rate of \$1.50 was reduced to \$1. For power, heating and cooking the old rate of 4 cents was changed to three. The present water rate of 15 cents per hundred cubic feet was reduced to 10 cents, and the minimum rate of \$20 per year was reduced to \$12.

FIRE AND POLICE

Test Wireless on Fireboat.

New York, N. Y.—The extension of the fire-alarm signal system until it should include the wireless control of fireboats is meant to be one of the new features of Com. Johnson's term in office. At the fire headquarters recently the commissioner made a test of the efficiency of the wireless apparatus installed on the James Duane. Hitherto, the minute a boat put off from the wharf entire control of its course from shore was lost. At the test the James Duane was ordered to respond to an alarm. A few minutes later a wireless message was sent to the effect that the fire was over and that the boat could return to its station. Almost immediately after a reply was received stating that the boat was putting about and would return to its station at once.

Sirens Restricted to Fire and Police Autos.

Fort Wayne, Ind.—The difficult problem of how to equip the fire and police automobiles so as to insure their being given a prompt right-of-way over the downtown streets, will be solved in a simple manner by the board of safety, if the ordinance that body will send to the council is passed. This measure will provide that no automobile driver may sound a siren horn within the city limits and will provide a penalty for violation. The fire and police machines will be equipped with the sirens and they will be employed as warning signals. Other machines, of course, may have the horns but they may not be used while being driven through the city. By this plan the public generally will know when it hears a siren that the police or fire department is demanding the right-of-way.

Automatic Fire Escape Demonstrated.

Albany, N. Y.—A demonstration of the operation of an automatic fire escape has been given at the City Hall in Albany under the direction of the state fire marshal's office and the fire departments of the large cities of the state. The fire escape demonstrated is a departure in life saving apparatus, but already has been adopted as the official escape in the Dominion of Canada. All the fire chiefs of the state who have so far witnessed the operation of the appliance are strongly in favor of its general adoption. The fire escape consists of a combination of gears set in a metal case from which hangs a steel cable covered with a fibre both fire and water proof. At the end a life belt is attached. This belt the person inside a burning building attaches under his shoulders and steps from the window where the device is located, hands and feet free, and the machine automatically lowers him to the ground. The machine lowers a person about five feet a second and fast enough to prevent a person's clothing igniting if flames were shooting from one of the windows or doors in the lower floors past which

the person must be lowered. The whole machine weighs only six pounds and can be attached to any outside window so as to afford escape from all parts of the building. One machine will lower five people a minute from the fifth story, and no factory building under our new laws can be constructed any taller than this. The action of the fire escape is duplex, while one line is descending the other is rising. Each line is capable of carrying about 1,700 pounds and as many as five persons clinging to the life belt with their hands have been lowered safely by it.

New Police Signal in Operation.

Bristol, Tenn.—A new police signal system, intended to improve the service by enabling the public to get the police more hurriedly at night, has just been installed in Bristol, Tenn., by Chief of Police Odel. Red and green lights have been placed on State street which will be flashed on by the central operators of the telephone exchange. When an officer is desired at night all that is necessary is to call central, who will flash on the light, which can be seen readily from any point on State street. The officer who sees it will go to the nearest telephone and call night headquarters on Fifth street.

Build "Bungalow Engine House."

Cincinnati, O.—An innovation in the construction of fire engine houses has been made in Cincinnati when the new house in Carthage was occupied for the first time. The building is what is termed a "bungalow engine house." It is a low building, with the sleeping quarters for the men and the engine room all on the same floor. This makes the old sliding pole, which has for years played a prominent part, a thing of the past. From the outside it would never be suspected that the building is an engine house. The facade resembles a theatre. The structure is of brick and stucco.

For Firemen's Convention.

Columbus, Neb.—One thousand dollars have been raised to defray the expenses of the thirty-second annual convention of the Nebraska State Firemen's Association, to be held in Columbus this month. The firemen's committee is at work on the program.

MOTOR VEHICLES

Install Auto Police Patrol.

Charlotte, N. C.—The new auto police patrol recently installed has been placed in operation. The machine is a



Courtesy Charlotte Observer.

NEW AUTO POLICE PATROL.

product of the Buick factory. Chief H. Moore, who is shown on the rear step of the patrol, expressed himself as entirely satisfied with the wagon.

Fire Chief Gets Runabout.

Binghamton, N. Y.—Fire Commissioner Henwood has concluded negotiations for a Cadillac car which will be placed in commission at once, complying with permission

granted by the Common Council and the Board of Estimate and Apportionment allowing him to purchase an automobile runabout for the assistant chief engineer. It is planned to put this car in the central fire station for the use of Chief Hogg. The new car is of high power and its purchase will materially add to the department equipment and eliminate another horse.

To Urge Motorization.

St. Paul, Minn.—An effort will probably be made by representatives of St. Paul commercial bodies to have the Assembly reconsider its action on the fire department's appropriation in the 1914 budget, and provide for motorization. This action follows a conference in Mayor Keller's office at which E. R. Townsend, engineer for the National Board of Underwriters, spoke on the efficiency of the St. Paul fire department and the advantages of motorization. The fire board's motorization plan was indorsed. The efficiency of the St. Paul fire department has not increased proportionately with the increase in valuation and number of fire alarms within the past seven years.

Seagrave Truck Stands Test Well.

Sault Ste. Marie, Mich.—The first real test of the city's new combination hose and chemical auto truck has been made. Some of the most difficult spots in the city were chosen over which to take the machine so that it might be thoroughly tested as to its efficiency for climbing hills and traveling over rough roads at a high rate of speed. The excellent manner in which the machine performed under the able management of Mr. Arthur Locker of Detroit, the company's representative, who is here to instruct the local firemen in the handling of the fire fighting apparatus, proved itself to be a valuable acquisition to the already splendid equipment of the city's fire department. The machine is made by the Seagrave company of Walkerville, Ontario, and gives promise of being a decided success.

GOVERNMENT AND FINANCE

Choose City Manager.

Titusville, Pa.—With the intention of systematizing the administration of the city affairs along efficient and economic lines, Titusville has organized its council under the "Clarke Bill," which provides for the creation of the office of city manager. City Engineer H. A. Holstein has been chosen for that office with a salary of \$2,100 per annum. He will have charge of the Departments of Engineering, Streets, Sewers, Water, Lighting and Purchasing. The new offices are distributed as follows: T. J. Dillon, Mayor; M. F. Cowden, Superintendent of Accounts and Finance; L. O. Bradley, Superintendent Public Safety; J. J. Sharpe, Superintendent of Parks and City Property, and W. A. Caldwell, Superintendent of Streets and Sewers.

To Vote on Commission Government.

Kenosha, Wis.—Petitions were filed with Mayor Head asking that the question of commission form of government for Kenosha be submitted to the people. The petitions are signed by 1,100 electors.

Quincy, Ill.—Judge L. McCarl has approved the petition for a special election to decide whether a commission form of government should be adopted in Quincy. The election was set for Jan. 27.

Advocate Commission Government in Virginia.

Richmond, Va.—Four methods of government for cities of Virginia have been determined upon by the legislative committee of the Virginia League of Municipalities. They are: a commission form of government; a modified form of commission government; government by general manager; and a modification of the general manager plan. A bill covering these several forms will be prepared. If it is enacted any city in Virginia will be able to choose its form of government and a charter will be given which will embody the particular form of government decided, in all its details.

Protests Fee System.

Boston, Mass.—The Finance Commission recommends to the mayor that the corporation counsel be instructed to present a bill to the Legislature providing that recording

fees for licenses issued by the Boston Licensing Board be paid into the city treasury, and also that the salary of the secretary of the board be fixed at an amount not exceeding \$3,500 a year. The Finance Commission believes that the salary of the secretary of the Licensing Board should constitute his entire compensation and that all the recording fees should be paid into the city treasury in the same manner as fees are paid in by officers or employees of the city of Boston. In the six years in which the recording fees were paid to the city treasurer the average amount per year was \$1,441.83, and in the year ending Nov. 30, 1913, the fees amounted to \$1,546.

To Change System of Bank Deposits.

Chicago, Ill.—That the city was losing \$200,000 a year interest on municipal funds as a result of its system of making bank deposits, has been asserted by Alderman Merriam on the floor of the council chamber. Mr. Merriam introduced an amendment to the code which provides that in advertising for proposals from the banks, bids shall be asked for on the basis of funds being deposited for periods of not less than ninety days. The amount of interest received by the city for the year 1912 was \$395,000, while the average daily balance of municipal funds in bank was \$17,435,607. Alderman Merriam asserted that if the city adopted a policy similar to that in effect in the City of Cleveland—leaving funds on deposit for not less than ninety days—the interest would be increased 50 per cent.

STREET CLEANING AND REFUSE DISPOSAL

Has New Garbage Plan.

Sacramento, Cal.—A plan for municipal collection of garbage has been evolved by City Commissioner E. M. Wilder, who will ask the Commissioners to provide funds to carry out the plan. Under the scheme Dr. Wilder proposes to have municipal garbage wagons with movable bodies of sheet iron which can be sterilized easily. These will be carried until filled and then removed by a crane at a central station, whence they will be transported to the crematory by a motor truck. Wilder says that the report of Foreman Shumate of the Crematory shows that garbage is being destroyed at the rate of 51 cents per ton, which is cheaper than at any other crematory on the Coast.

Experiment on Garbage Collection.

Peoria, Ill.—With the purchase of ten large dump wagons the free collection of garbage in an experimental way has been begun. While no definite plan has been decided upon it has been practically agreed that the best method of procedure would be to begin by starting one or two wagons in certain limits, by seeing that each performed a full day's work and by noting the tonnage of collection. For the first six months the system will be in an experimental stage. The districts will be arranged and the collection capacity of the wagons in downtown and residence districts ascertained; likewise what crew is required with each to average the best results in amount of garbage collected.

Urge Electric Trucks for Waste Collection.

Chicago, Ill.—According to an estimate prepared by the efficiency bureau of Chicago, following an investigation, the use of electric motor trucks in hauling the city's garbage and waste would save the city \$15,775 per year, while in hauling crushed stone and asphalt 25 per cent of the present cost could be saved. Upon this estimate the bureau has recommended the adoption of trucks. To fit the service to the motor truck it is planned to reorganize the system of garbage collection, for there are at present but 110 miles of improved alleys in Chicago out of a total of 2,028 miles. The new idea is to increase the length of hauls by collecting the garbage locally on the bad alleys by carts carrying small units. These loads will be transferred at suitable points to motor vehicles, and, in turn, these motor wagons will at sub-stations transfer their loads to big tractors in trains, which will haul the garbage to the final disposal point.

Consider Ash Collection City's Duty.

Poughkeepsie, N. Y.—At a meeting of the Board of Health a vigorous protest has been made against the action of the Common Council in abolishing the collection of ashes for this year. The matter was brought to the attention of the board by Commissioner Hinkley. He claimed that ash heaps in the general term are just as detrimental to health as garbage, and stated that the board should not allow this to take place without making a protest. This city has received the name during the past few years of having taken a forward step toward cleanliness, and the board has been very busy along that line.

RAPID TRANSIT

Plan Interurban Lines.

Bartlesville, Ok.—All of the towns to the north of Bartlesville through Northern Oklahoma and Southern Kansas have become greatly interested in the several interurban projects that have been brought out during the past weeks, and as a consequence there has been much agitation of the question. Meetings have been held in many of these towns. The plans contemplate a great system and net of interurban lines that will ultimately extend from Central Oklahoma will connect with lines that will reach as far north as Topeka and Kansas City to the east with lines to Joplin and St. Louis.

Estimates Cost of Municipal Railway.

San Francisco, Cal.—The City Engineer's department has reported to the Supervisors that the cost of materials and cars for the new Municipal Railway lines is estimated at \$1,281,800, exclusive of the part of the Church street line to be built south of Eighteenth street, which will amount to \$65,100 additional, and that the cost of construction of these lines, 11.96 miles in extent, will be \$950,300. Other items of expenditure are: Purchase of Union street line, \$350,000; addition to car barn of Geary street line, \$150,000; land for car barn at Seventeenth street, \$85,000; construction of this car barn, \$135,000; work car and tower wagon, \$10,000; total, exclusive of the Church street line south of Eighteenth street, \$2,960,100. The Church street road from Eighteenth to Thirtieth street, 1.37 miles in length, will probably not be built until some time after the other part of this line is finished. The cost of constructing is estimated at \$163,800. The expense of engineering and inspection is put down at \$150,000, the estimated outlay thus amounting in all to \$3,273,900. The bond issue voted for these lines is \$3,500,000.

Favor Municipal Auto Line.

Jersey City, N. J.—By a unanimous vote the City Commissioners have gone on record in favor of municipal ownership of transportation service on the Boulevard and against the proposition of the Auto Coach Company for a franchise to operate a line of auto coaches on the Boulevard. The City Commission furthermore has declared in favor of a municipal auto line with a three cent fare. Mayor Fagan heartily endorsed the idea and said that it well reflected public opinion.

MISCELLANEOUS

Cleveland Prepares for Extensive Public Work.

Cleveland, O.—With the inauguration of Cleveland's new government providing for a definite concentration of responsibility the first of this year, the city of Cleveland will begin preparation for public and semi-public works which will cost about \$30,000,000. These will include the proposed new union passenger station, to cost \$17,000,000; water purification works, \$4,000,000; the Clark avenue bridge, \$1,000,000; new city hall completion, \$2,600,000; purchase of \$1,400,000 worth of property for mall and completion of the \$2,000,000 municipal electric light plant.

Consider Competing With Contractors.

Williamsport, Pa.—The new city council is considering the advisability of competing with contractors for public improvements and it is likely that this matter will be brought up in open discussion in a meeting. It is claimed

that such a move on the part of the city would result in material savings to the municipality. The plan is patterned after that announced by the Altoona commission. Commissioner J. A. L. Minor, superintendent of highways, is an experienced contractor and it is believed that under his supervision the city could pave streets, construct sewers, and do other work as cheaply as a contractor and that the coffers of the city treasury would be considerably enriched by the saving. The city would have to submit bids in the same way proposals are made by contractors.

Municipal Group in Springfield, Mass.

Springfield, Mass.—The citizens of Springfield have dedicated what is known as the Municipal Group. It undoubtedly is one of the most beautiful, most complete and largest set of civic buildings in the country. Between two large buildings of classic design is an immense tower. These two structures are the auditorium and the city office building. The group takes the place of the City Hall, which was burned in 1905. It cost \$2,000,000. Pell & Corbett were named architects in a competition of many men well known in that profession. The municipal buildings, as seen from Main street, through the trees of the park, present to



Photo by A. D. Copeland, Courtesy Springfield (Mass.) Union.
MUNICIPAL BUILDINGS IN SPRINGFIELD.

view two rows of classic columns surmounted by low but heavily ornamented pediments, while over the trees the Renaissance tower, 300 feet in height, is seen silhouetted against the sky. The auditorium is entered through seven large doorways, this number having been required to give facility for the simultaneous exit of a crowd. All of the openings have double bronze doors which open back into panels at the sides; the doors of the centre opening are solid cast bronze with eight ornamental sculptured panels representing events of importance in the history of Springfield. The office building is nearly identical with the auditorium but different in its interior arrangement and architectural treatment.

To Abolish Billboards.

Denver, Colo.—Denver will be rid of its billboard pest for all time if the city council acts favorably upon the recommendation which City Attorney I. N. Stevens will make to it, as a result of the victory won against the city by the billboard companies in the contest against the new billboard ordinance before Judge Ira C. Rothgerber of the County Court, the city attorney said: "I am in favor of abrogating billboards entirely. They are unqualified nuisances and can be abolished on three grounds: first, that they are a

menace from fire; second, that they hinder the police in the protection of its citizens from thugs and thieves; third, that they menace the health of the people."

Will Open Municipal Playhouse.

Vassar, Mich.—At a meeting at the public school building a committee was appointed to lease the Wonderland theatre building and equip it for a municipal playhouse and gymnasium. Almost every business man in Vassar has contributed to the fund and there is great enthusiasm over the project. School students, young people, business men and women will be taken into membership. The building is 100 by 30 feet, is on the ground floor, and is centrally located.

Municipal Dance Hall for Detroit.

Detroit, Mich.—Detroit may have a municipal dance hall. Alderman E. Barnett has announced that he will introduce a resolution in council providing for an appropriation for the construction of a city dancing pavilion on Belle Isle.

Telephone System in Public Schools.

Milwaukee, Wis.—A private "unlimited" telephone system for communication between all the schools of the city, with a "central" at the new school headquarters, is being installed, and will be ready for operation some time this month. It also is for a general connection between school headquarters and the general telephone system of the Wisconsin Telephone Company.

Lights for Baby Buggies.

Cincinnati, Ohio.—Mothers are up in arms over a proposed ordinance to be enacted by the common council here whereby all baby carriages must be provided with lamps at night if propelled through driveways in park or city streets. The attendant must carry lanterns or some other lights that will make them visible to auto drivers under terms of the ordinance. The regulations are aimed to decrease accidents.

Present Park to City.

Philadelphia, Pa.—What is regarded as one of the most substantial gifts for park purposes received by the city was that accepted by the Fairmount Park Commission, of a tract of land consisting of 10½ acres, in the Twenty-second Ward, from the heirs of Thomas and Elizabeth Wharton McKean. "Fernhill Park" is the name to be given to the tract. It was one of the few gifts that accompanied with it the necessary funds with which to improve the site, \$26,500 being included for this purpose.

Will Eliminate Gambling Devices.

South Bend, Ind.—One of the first steps to be taken by Mayor-elect Fred W. Keller, when he goes into office on Jan. 5, 1914, will be to order all cigar stores and other places of business to eliminate slot machines, punch boards and dice games. It is said that some stores here are making several thousand dollars a year from their penny slot machines alone. The step which Mayor-elect Keller has announced he will take in regard to gambling devices will be a fulfillment of one of his campaign promises to rid the city of vice and illegal practices.

Must Have Sleigh Bells.

Schenectady, N. Y.—An order has been issued to all of the police in the city by Chief of Police Rynex in which he calls attention to the city ordinance requiring that all sleighs that travel faster than a walk must be equipped with bells of sufficient size to give everyone a warning of the sleigh's approach. The ordinance, now that there are many sleighs on the streets, will be strictly enforced.

May Change Name of Town.

North Reading, Mass.—A campaign to change the name of North Reading has been begun by the Board of Trade. Postal cards were sent to the voters and, if the majority favor the change, an article will be drawn for consideration at the next town meeting. The reasons given for the change are that the prefix "North" is detrimental to the growth and business interests of the town, that people outside the town are of the opinion that North Reading is a part of Reading and that the name causes delay in the transfer of mail, express and freight.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Salaries—Increase—Waiver.

Walsh v. City of New York.—Where the employee of a city accepted his wages for a period of three years, such acceptance was a waiver of any right he had under the statute to recover the per diem increase for that period.—New York Supreme Court, 144 N. Y. S., 8.

Streets—Use of Vault Space—License.

Appleton et al v. City of New York.—While a municipality may require an abutting owner having the fee in the street to secure from it a license to use vault space beneath the street, it cannot impose a rental, though in the form of a license tax, upon the abutting owner for such use.—New York Supreme Court, 144 N. Y. S., 138.

Injuries from Defective Streets—Notice.

Tepfer v. City of Wichita.—Where a city grants permission to a third party to plow or excavate in a street, it is bound to exercise diligence for the protection of the traveling public and to know the condition of the street while the work is in progress and after it is done the same as it would where the work is directly done by its own officers or agents.—Supreme Court of Kansas, 136 P. R., 317.

Officers—Removal—Defense.

Barrett v. Board of Commissioners of Atlantic City.—In proceedings to remove a city comptroller from office for payment of a judgment in violation of a supersedeas staying such payment, it was no defense that he had been advised in this course by the city solicitor.—Supreme Court of New Jersey, 88 A. R. 856.

Personal Property Taxes—Injunction.

City of Lancaster v. Pope.—In this state the collection of an illegal tax on personal property may be enjoined, the remedy at law being inadequate, since an action to recover taxes lies only where they have been paid under duress or restraint, and the officers could therefore avoid such remedy by bringing an action at law instead of distraining.—Court of Appeals of Kentucky, 100 S. W. R., 509.

Injuries—Evidence—Notice.

Town of Meeker v. Fairfield.—In an action against a town for personal injuries from a fall on a crosswalk, evidence that prior to the accident to plaintiff other persons had slipped and fallen upon the same walk was admissible only on the issue of defendant's notice of the condition of the crosswalk and not to establish negligence on the part of the defendant.—Court of Appeals of Colorado, 136 P. R., 471.

Injuries—Nature of Defect in Street.

City of Oakdale v. Sanders' Ex'x.—Where a complaint for injuries on a city street alleged that the city had placed stepping-stones across the street and had also thrown rock into a mud hole surrounding such stones, and was negligent in allowing the street to remain in a dangerous condition, the gist of the action was whether the city was negligent in permitting the street to become and remain in a dangerous condition, and not whether the plan of the stepping-stone crossing constructed by the city was manifestly dangerous.—Court of Appeals of Kentucky, 160 S. W. R. 252.

Drainage—Expert Testimony.

Reinke v. Sanitary Dist. of Chicago.—Experts are permitted to examine complicated accounts and records and give their conclusions therefrom, to prevent loss of time and confusion of the jury by requiring the jury themselves to consider the original records. Skilled engineers may testify as to the amount of land which will be overflowed with water within certain embankments at a given height, or as to the causes of the overflow of a street at given places, or the probabilities of a lake overflowing a given area, etc.—Supreme Court of Illinois, 103 N. E. R., 236.

Injuries—Failure to Give Notice.

Ransom v. City of South Bend.—Rem. & Bal. Code provides that all claims for damages against any city or town of the second, third or fourth class must be presented to the council and filed with the clerk within 30 days after the claim accrued. Held, that such requirement is mandatory, and that failure of a person, injured by an obstruction in the streets, to file notice of her claim until 73 days after the happening of the accident was not excused by the fact that she was confined to her bed for several months, and was so incapacitated that she was unable to attend to having the claim filed and presented within the time specified.—Supreme Court of Washington, 136 P. R., 365.

Franchise to Use Streets—Forfeiture.

People ex rel Fitzhenry v. Union Gas & Electric Co.—Where a city had general power to grant permission to a public service corporation to use the streets for the distribution of gas and electric current, and defendant, under its franchise to use the streets, took possession thereof and expended large sums in making extensive improvements and incurred large liabilities on the faith thereof and without objection, the city was estopped to claim that the franchise was invalid because of a failure to perform certain precedent conditions with reference to the obtaining of the consent of abutting property owners.—Supreme Court of Illinois, 103 N. E. R., 245.

Change of Grade—Benefits.

Mayor and Aldermen of Knoxville v. Barton.—Under Acts 1891, as amended by Acts 1893, the first section of which allows to an abutting property owner consequential damages incident to changing the grade of a street, and the second section of which provides that "all benefits accruing" from such improvements shall be allowed to reduce the damages, "all benefits accruing" means accruing to the owner as owner of the particular property, not as a taxpayer or resident of the vicinity sharing benefits common to all.—Supreme Court of Tennessee, 159 S. W. R., 837.

Officers—Compensation—Powers.

People ex rel. Judge et al v. Board of Commissioners of Cook County.—The members of the board of election commissioners for a town in the city of Chicago, who are appointed for a definite term of office, for the exercise of certain powers and the performance of certain duties, under the laws of the state, in the city of Chicago, are "municipal officers" within the meaning of Const. forbidding the increase or diminution of salaries of municipal officers having a definite term, even though the board itself is not a municipal corporation and the commissioners are appointed by the county court.—Supreme Court of Illinois, 103 N. E. R., 282.

Taxes—Disposition—Firemen.

Cary v. City of Oneida.—Under Insurance Laws, which are continuations of Laws 1875 and 1879, and provide that moneys received as a tax upon foreign insurance companies shall be paid for the use and benefit of the fire department of the several municipalities and that the city chamberlain shall apportion and pay over such moneys to the treasurers of the fire companies which are recognized by the common council, members of a volunteer fire company which was recognized by the common council of a city are not entitled to the whole of the money to the exclusion of the paid firemen; there being no statutory provision giving them any such preference.—New York Supreme Court, 144 N. Y. S., 57.

Sewerage Improvement—Injunction.

City of Newport et al v. Lang.—Where a city charter provided that the council should by order or by resolution determine what lots would be benefited by the construction of a sewer and the amount of the taxes to be levied upon each, a petition, seeking an injunction against the construction of a sewer, which alleged that no ordinance for the construction was adopted, but did show that the board of commissioners adopted certain recommendations, without setting out the records with reference thereto, when construed most strongly against the pleader, did not charge that the commissioners did not determine the benefit by ordinance or resolution.—Court of Appeals of Kentucky, 160 S. W. R., 499.

NEWS OF THE SOCIETIES

Calendar of Meetings.

December 29-January 3.

AMERICAN ASSOCIATION OF THE ADVANCEMENT OF SCIENCE.—Sixty-fifth annual meeting, Atlanta, Ga. L. O. Howard, Secretary, Smithsonian Institution, Washington, D. C.

January 5-7.

SOCIETY OF CONSTRUCTORS OF FEDERAL BUILDINGS.—Fifth annual convention. Washington, D. C. T. R. Maul, Secretary, 400 P. O. Building, Philadelphia, Pa.

January 10.

MUNICIPAL ENGINEERS OF THE CITY OF NEW YORK.—Eleventh Annual Dinner, Hotel Savoy. George A. Taber, Secretary, 29 West 39th St.

January 16.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—Annual meeting, New York City. J. R. Wemlinger, Secretary, 11 Broadway, New York City.

January 19.

MONTANA INSTITUTE OF MUNICIPAL ENGINEERS.—Second annual meeting, Great Falls. Carl C. Widener, Secretary, Bozeman. January 20-22.

AMERICAN WOOD PRESERVERS ASSOCIATION.—Tenth annual convention, New Orleans, La. F. J. Angier, Secretary, Timber Preservation Company, Baltimore, Md.

January 21.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Annual meeting, New York. Chas. W. Hunt, Secretary, 220 West 57th street, New York City.

January 21.

TENNESSEE MUNICIPAL LEAGUE.—Second annual meeting, Maxwell House, Nashville, Tenn. John W. Horton, Secretary, Tullahoma.

January 21-23.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS.—E. A. Scott, Secretary, 29 West 39th street, New York City.

January 27-29.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—Mid Year Meeting and Banquet, New York, N. Y. E. B. Burritt, Secretary-Treasurer, Engineering Societies' Building, 29 West 39th Street, New York, N. Y.

January 29-31.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Annual meeting, Montreal, P. Q. Prof. C. H. McLeod, Secretary, 176 Mansfield street, Montreal, Canada.

February 12-13.

SOUTHEASTERN SANITARY ASSOCIATION.—Second annual meeting, Columbia, S. C. Dr. James A. Hayne, President, Columbia, S. C.

February 12-14.

NATIONAL CONFERENCE ON CONCRETE ROAD BUILDING.—Auditorium Hotel, Chicago, Ill. J. P. Beck, Secretary, 72 West Adams St., Chicago, Ill.

February 16-20.

NATIONAL ASSOCIATION OF CEMENT USERS.—Fourth Annual Convention, Chicago, Ill. Edward E. Krauss, Secretary, Harrison Building, Philadelphia, Pa.

February 26-27.

INDIANA SANITARY AND WATER SUPPLY ASSOCIATION.—Seventh annual meeting, Hotel Severin, Indianapolis, Ind. Dr. W. F. King, Secretary, Indianapolis.

Municipal Engineers of the City of New York.

At the regular meeting in the Engineering Societies Building, 29 West 39th street, New York, December 22, Rudolph P. Miller, superintendent, Bureau of Buildings, presented a paper on "Municipal Building Inspection." The paper was illustrated by lantern slides.

On Saturday afternoon, December 20, an inspection trip was made to three freight terminals of the New York Central railroad, where some of the problems connected with distribution of freight in a large city were explained.

On Saturday, January 3, an inspection trip will be made to the city tunnel of the Catskill Aqueduct.

The annual dinner will be held at Hotel Savoy, 5th avenue and 59th street, Saturday, January 10 at 7 p. m.

Tennessee Highway Association.

Following closely on the heels of the appointment of forty-eight prominent Tennesseans as state highway commissioners by Governor Hooper comes the formation of the Tennessee Highway Association, which has filed a charter of incorporation. The new association, whose purpose it is to arouse interest in better roads over the state and to suggest proper legislation to the legislature along these lines, held its first meeting at the Hermitage Hotel and proceeded to organize.

At the morning meeting the association elected the following officers: J. N. Fisher, of Morristown, president; A. R. Dodson, of Humboldt, vice-president; Cyrus Kehr, of Knoxville, secretary; D. M. Armstrong, of Memphis, treasurer. In addition to these, who will serve also as directors, the following directors were elected: T. R. Preston, Chattanooga; R. B. Baird, Jellico; P. D. Houston, Nashville; Fred Collins, Milan; W. A. Sadd, Chattanooga; Capt. T. F. Peck, Nashville. All these were present at the meeting.

Vice-presidents for every congressional district were also elected and these will see that the organization is perfected in every county. These vice-presidents follow: First district, Gale P. Kale, Rogersville; Second district, Arthur Halzinger, Dandridge; Third district, Capt. T. A. Embry, Winchester; Fourth district, O. K. Holladay, Cookeville; Fifth district, G. B. Gittner, Murfreesboro; Sixth district, Judge A. R. Gholson, Clarksville; Seventh district, W. B. Romine, Pulaski; Eighth district, G. H. Robertson, Jackson; Ninth district, W. P. Caldwell, Union City; Tenth district, W. A. Johnson, Ellendale.

The object of the association is to create a business-like, non-political body whose purpose is to educate the people on the absolute necessity of better roads in the state. It is stated that the toll that Tennessee pays to bad roads is something over fifty million dollars a year. The association will prepare a comprehensive bill which they will attempt to have endorsed by all political parties in the state, and presented to the next legislature. To this end a committee was appointed. This committee will also report at a meeting to be held in January on plans for perfecting the organization and outlining a program of work for the association.

Alabama Association of Highway Engineers.

The annual meeting of the Alabama Association of Highway Engineers will be held in Montgomery, Jan. 10, and between 40 and 50 members will be here. The executive committee recently held a meeting and made plans for the sessions which will be held in the offices of the state highway department at the capitol.

Montana Institute of Municipal Engineers.

The program for the second annual meeting to be held at Great Falls, January 19-21 is as follows:

January 19.

Morning.—Organization, reading of minutes, secretary's report, president's address. Afternoon—Trip to smelter plant. Evening—Social session.

January 20.

Morning—Water Filtration for Montana Cities, M. L. Morris; Discussion by members; Everyday Problems, C. E. Durland, discussion by members; Needed Legislation, C. W. Helmick, discussion by members. Afternoon—Trip to the dam at Great Falls. Evening—Social session at Elks Club or Opera House.

January 21.

Morning—Sewage Disposal for Montana Cities, A. L. Jaqueth, discussion by members; What I Learned About Good Roads at Detroit, Wm. Jordan, Jr., discussion by members; Paving, C. C. Widener, discussion by members. Afternoon—Election of officers, Talks by Manufacturers Agents and Paving Contractors. Evening—Banquet.

The officers of the society are Henry Gerharz, president; Chas. W. Helmick, vice-president; Carl C. Widener, secretary-treasurer. Directors, M. L. Morris, Wm. McLean, Henry Gerharz, Chas. W. Helmick, Carl C. Widener.

Tennessee Municipal League.

Mayor Hilary E. Howse, president of the Tennessee Municipal League, has issued a call for the league to meet in Nashville Jan. 21, in the assembly room of the Maxwell House. The league was organized a year ago when thirty-four mayors of Tennessee cities met at the invitation of Chares C. Gilbert, Davidson county representative in the legislature. The following were elected to fill the offices of the league for the first year: Hon. Hilary E. Howse, Nashville, president; T. C. Thompson, Chattanooga, vice-president; J. M. Dedman, Columbia, vice-president; C. E. Griffith, Jackson, vice-president; John W. Horton, Tullahoma, secretary and treasurer. Executive committee: A. M. Martin, Lebanon; R. L. Stockard, Camden; W. W. Stockard, Shelbyville; E. Thatch, Cleveland. An effort will be made to have every mayor and members of the commissions where the towns have gone under a commission form of government present at the next meeting in January. Men who are authorities on municipal government will be invited to address the league. An illustrated lecture on city planning will be given. At the meeting of the league in January officers for the ensuing year will be elected.

Louisiana Engineering Society.

At a meeting, Dec. 8, at Tulane University, New Orleans, Professor R. S. Cocks read a paper on Louisiana pines. He said there were five kinds—Long leaf, short leaf, Cuban, loblolly and spruce pine. Microscopic sections of each were shown.

The following officers have been selected for 1914: W. H. Williams, president; Ole K. Olsen, vice-president; James M. Roberts, secretary (re-elected); Hunter Coleman, Jr., treasurer; Professor W. B. Gregory, director (re-elected).

Washington Society of Engineers.

Officers of the Washington Society of Engineers for the ensuing year were elected at the eighth annual meeting of the society last week at the Cosmos Club.

The officers are: William Bowie, president; W. A. McFarland, vice-president; J. C. Hoyt, secretary, and C. F. Jeansen, treasurer. The following were chosen directors: Van H. Manning, F. W. Albert, J. S. Conway, A. L. Baldwin, F. C. Boggs and G. W. Littlehales. Frank Sutton and John Hanna, former presidents of the society, will also act on the board of directors.

Short addresses were made by A. P. Davis, chief engineer of the reclamation service; Frank Sutton, retiring president, and Mr. Bowie. A seal for the society, which has as its basic feature the triangle, was adopted. A buffet luncheon was served.

PERSONALS

Bartlett, C. Terrell, of Bartlett & Raney, consulting engineer, San Antonio, Tex., has been appointed consulting engineer of Bexar County to have charge of construction of bridges.

Behrman, Isadore, Jr., assistant in City Engineers Department, Baltimore, Md., has been promoted to be assistant engineer as the designer and constructor of the Lake Monticello filtration plant, succeeding George F. Wiegardt, resigned.

Druar, J. G., St. Paul, Minn., has been retained to investigate the question of water supply for the city of Alexandria, Minn.

Heaslet, James G., South Bend, Ind., chief engineer of the Studebaker Corporation, has been elected vice-president, to have charge of engineering and production.

Jacobson, B. C., Hillyard, Wash., has been appointed city engineer, succeed Arthur Wadham.

Stanley, Thomas P., Athens, Ga., has been appointed supervisor of roads under the State Prison Commission. Mr. Stanley has had charge of the building of roads in Clarke County for the past ten years.

Toner, A. C., assistant engineer, Baltimore (Md.) Sewerage Commission, has resigned and will become associated with a contracting firm.

Tschurgi, M., Cedar Rapids, Ia., has been appointed city engineer of Monticello, Ia. He will have charge of a large amount of paving work.

Wiegardt, George F., recently assistant engineer on the design of the Lake Monticello filtration plant of the Baltimore, Md., Waterworks, has been appointed assistant to the chief

engineer of the Pennsylvania State Dam Commission.

The following officials have recently been elected or appointed:

WASHINGTON.

Hillyard.—W. N. Eakin, mayor; E. H. Hopkins, health officer.

Raymond.—A. C. Little.

Kelso.—B. L. Hubbell, mayor.

Winlock.—Clyde Kennedy.

Dayton.—W. C. Godard, mayor.

Freewater.—H. R. Van Slyke, mayor, re-elected.

Sumpter.—L. C. Edwards, mayor, re-elected.

Orengo.—M. McDonald, mayor.

South Bend.—C. A. Coulter, mayor.

Pe Ell.—W. J. Harlan, mayor.

Bremerton.—D. L. Cady, mayor.

Montesano.—S. S. Moore, mayor.

Auburn.—J. B. Waugh, mayor, re-elected.

Snohomish.—Adolph Watson, mayor.

Pt. Townsend.—Oscar Klocker, mayor.

Gold Bar.—T. J. Precious, mayor.

Edmonds.—L. P. Ash, mayor.

Stanwood.—D. O. Pearson, mayor.

Arlington.—Geo. Kuntze.

Marysville.—E. E. Colvin, mayor.

Tolt.—F. D. Creese, mayor.

Rossville, Tenn.—C. R. Jones, mayor.

Muncie, Ind.—F. W. Puckett, chief of police.

Hopkinsville, Ky.—F. K. Yost, mayor; street engineer, B. F. McClaid; E. P. Fears, fire chief.

Milan, Tenn.—Gordon Van Hook, mayor.

Dalton, Ga.—R. B. Bowen, mayor.

Amarillo, Tex.—J. N. Beasley, mayor.

Ocala, Fla.—J. D. Robertson, mayor.

Webster, Fla.—Mayor, Pierre D'A. Pratt; clerk, C. L. Brown.

Highland Park, Tex.—Mayor, W. A. Fraser.

Macon, Ga.—Fire Chief, Lawrence A. Miller.

Meriden, Conn.—Mayor, Daniel J. Donovan.

Starke, Fla.—Mayor, E. E. Canova.

North Adams, Mass.—Mayor, W. E. Brown.

Brooklyn, Md.—Chief of police, Thomas W. Irwin.

Clarkson, Ga.—Mayor, E. L. Waggoner, reelected.

Rye, N. Y.—Park commissioner, Henry C. Weeks.

Albany, O.—Road Supervisor, Clarence Scott.

Pelham, Ga.—Mayor, J. J. Hill.

Michigan City, Ind.—Chief of police, August J. Funk.

Uniontown, Pa.—Chief of fire department, William Coates.

Haverhill, Mass.—Chief of fire department, John B. Gordon.

Columbus, Ga.—Mayor John C. Cook has been installed in office and members of the standing committees named as follows: Accounts and

Contracts—Reich, Straus, Everidge; Bridges and Wharf; Spencer, Everidge, Joerg; Cemeteries—Roberts, Williams, Hanserd; City Improvements—Everidge, Spencer, Gordy; Fire Department—Lawrence, Dismukes, Spencer; Finance—Straus, Reich, Dismukes; Gas and Street Lights—Dismukes, Jones, Germany; Hospital—Hanserd, Joerg, Roberts; Insurance—Spencer, Gordy, Hanserd; Market and Magazine—Jones, Hanserd, Reid; Parks and Commons—Germany, Lawrence, Williams; Police—Mizell, Worsley, Lawrence; Public Schools—Gordy, Roberts, Mizell; Sanitation—Williams, Reich, Germany; Streets and Sewers—Reid, Mizell, Worsley; Waterworks—Joerg, Dismukes, Straus.

Wooley, W. Thomas, formerly city engineer of Schenectady, N. Y., has been appointed city engineer of Syracuse, N. Y., by Mayor Louis Will. Mr. Wooley has also occupied the positions of city engineer of Auburn, N. Y., and engineer Public Improvement Commission Hoosic Falls, N. Y.

Crawford, Norman M., Youngstown, O., has been elected president of the Reading, Pa., Transit and Light Company, succeeding William S. Barstow.

Governor Tener recently selected five engineers to constitute the State Engineers' Commission, which is to draft a code to govern engineers and their qualifications in the state. He named John Price Jackson, Commissioner of Labor and Industry, recently dean of the School of Electrical Engineering of State College and president of the Engineers' Society of Pennsylvania; Samuel A. Taylor, Pittsburgh, president of the Engineers' Society of Western Pennsylvania, and past president of the American Institute of Mining Engineers; George S. Webster, Philadelphia, chief engineer, Department of Public Works; F. Herbert Snow, chief engineer, State Department of Health and Sanitary Expert, and J. Murray Africa, engineer and surveyor, Huntingdon.

Syracuse, N. Y.—Mayor Louis Will has announced his selections for heads of city departments as follows: Commissioner of Public Works—Albert Van Wagner, \$4,000 a year; Corporation Counsel—Giles H. Stillwell, \$4,000 a year; Commissioner of Public Safety—William Paige Hitchcock, \$3,500 a year; City Engineer—W. Thomas Wooley, \$4,000 a year; Commissioner of Charities—Jay M. Strong, \$2,400 a year; Executive Clerk to Mayor—Charles W. Kirschbaum, \$2,200 a year; Sealer of Weights and Measures—Edward Gordon, \$1,400 a year; Civil Service Commissioners—Hugh M. Tilroe, \$500; Charles J. Markert, \$350; Joseph O. Whitcomb, \$350 a year; Health Officer—Dr. Frederick W. Sears, \$2,200 a year; Superintendent of the Bureau of Water—Charles A. Windholz, \$3,000 a year.

NEW APPLIANCES

KEROSENE TRACTOR-ROLLER.

New Company Markets Tractors and Rollers for Street, Road and Highway Work.

The Ohio Tractor-Roller Sales Company, of which W. W. Williams, Columbus, Ohio, is president and Newton M. Miller is general manager, was recently organized under the laws of Ohio for the purpose of buying the output of the Ohio Tractor Mfg. Co., of Marion, Ohio, and for placing articles manufactured by that company on the market. The new company has its sales office on the fifth floor of the Brunson Bldg., Columbus, Ohio, and will actively push the sale of the Kerosene Road Roller, a ten-ton two-cylinder machine. Also the tractor in the two sizes, 50 and 30-H.P. and the "Leader Steamer," all of which are built by the Ohio Tractor Mfg. Co.

The combination Tractor-Roller has a very attractive feature in its mechan-

countered in road construction will appeal to contractors. The construction is somewhat similar, but owing to special principles in its power development, it has heretofore offered some very difficult and puzzling propositions for the operator when used for power on a tractor, since it is necessary to run the tractor forward or backward, and it is very difficult and impracticable to construct engines which can be reversed, thus making it necessary to use double sets of gears, one to run forward and one to run backwards, requiring much space and making the machine too complicated. All these difficulties and troubles are met in a very simple and an absolutely satisfactory manner with the friction drive. By it we get both forward and backward motion without a single extra gear, using exactly the same parts to direct power one way that we use to direct it the other. It is wholly without complications of any kind, even

ing the unnatural wear and strain at one particular point of the machine, and preventing any uneven or out-of-line wear of engine bearings, all of which must take place where power is taken from one side alone.

"This fraction drive is not to be compared with the friction clutch, as the clutch will slip until it grips, and when released it is entirely off. With the clutch it is ever slipping and gripping—all off or all on. It affords no relief between the engine and its load as when it takes hold, it takes hold wholly, and with the heavy fly-wheels in motion it is apt to result in breaking some part of the machinery when striking a rough place in the road. With the friction wheels the sudden shock is released in part in an instant, preventing the breaking of the gear and other parts, at the same time being able to hold the heaviest engine or to draw any load to the capacity of the engine's power. By this method you can start your load as slow and easy as does the steam engine start its load, and then gradually increase your speed until you reach that to which you are geared. The powerful control the operator has over the tractor through this method of transmission can only be realized by seeing the tractor operated. With the one lever he can start, stop, or reverse his tractor instantly.

"While there has been many dismal failures in the attempt to transmit the power of a gasoline engine to a truck, some of which has been through attempts to do so with friction drive, the Ohio Tractor Manufacturing Company had demonstrated that the friction drive tractor through our patent is a success.

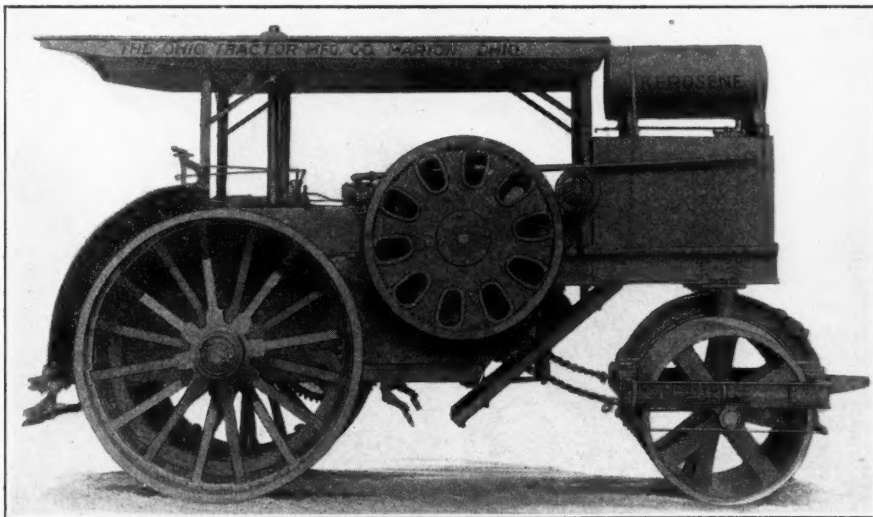
"The principle adopted in the construction of our tractor permits the engine proper to constitute a unit within itself and the truck a separate and distinct unit within itself, each being independent of the other, there being no part of gearing fastened or connected to any part of the engine.

"Our patent friction steering device is undoubtedly the most successful arrangement for steering traction engines ever used. It removes all the hard work from the operator, and is admired by all who see and handle the machine; no one appreciating this improvement more than the operators. A few pounds of pressure on the steering lever is sufficient to turn or guide the machine anywhere desired.

NEW TRUCK TRACTOR.

Two-Wheeled Tractor Permits Use of Old Steel-Tired Truck.

Merchant & Evans Company, Philadelphia, Pa., has just put on the market a four-five-ton tractor truck. The novelty and usefulness of this vehicle consists in the arrangement of the motor,

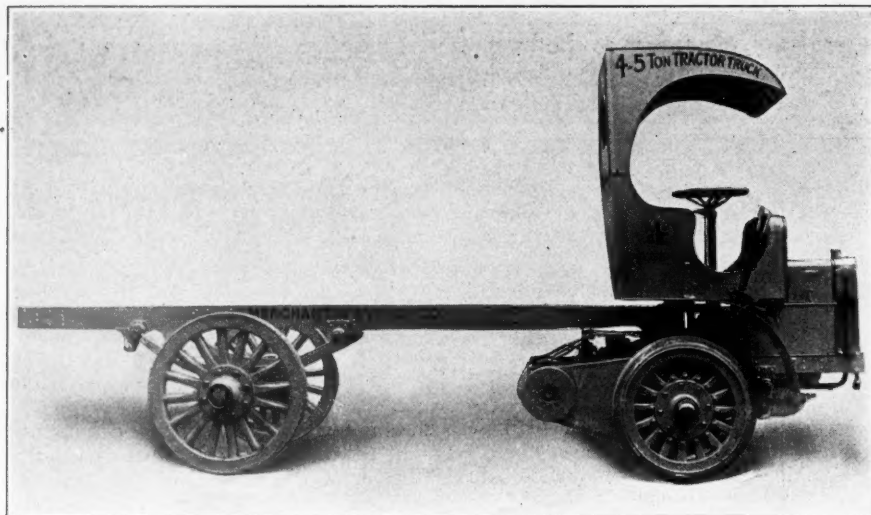


KEROSENE BURNING TRACTION ENGINE AND ROLLER.

ical operated hoist as shown in the illustration, by which the change is made from tractor to roller. The weight of the front end can be raised and supported, making it very easy to remove roller or truck, whichever has been used, and installing the other. Never in making this change is anything further needed than a monkey wrench. The same arrangement can be placed on the standard roller at a small cost, which makes it much safer in traveling over slippery roads and adds to its power when used for pulling a grader.

"Through the patent friction drive," states Mr. Miller, "the power is taken from both sides alike, directly from fly-wheels. We reverse the machine without reversing the engine. We simply reverse the application of the power. We believe the convenience, utility and general efficiency of the Kerosene engine as applied to the many and various power purposes en-

much simpler than the reversing of steam tractors, and at the same time guarantees absolute reliability and satisfaction, being heartily endorsed by all owners. This method will transmit any amount of power required, and will outwear the steel gearing. Neither does it work as the disc friction drive where a point of contact does the work, but with our methods of transmission it is a plane of contact, the length of which plane equals the thickness of the two friction wheels, since convex surface of the friction wheel engages the inner or concave surface of band or fly wheel. When one is in contact on one side, the one on the other side is doing its half of the work, and in this way we take power from both sides alike making no side strain between truck and engine. This prevents uneven wearing of the bearings and distributes wear and strain over a much greater surface, thus eliminat-



TWO WHEELED TRACTOR FOR HEAVY TRUCKS.

clutch, transmission and jackshaft as a unit on a dead front axle, so that axle, wheels, engine, transmission, jackshaft, etc., turn with the front wheels up to a 90 degree angle, right and left. This unit is very compact, and is turned bodily by means of the steering wheel, through bevel gears, which rotate a worm that engages the circumference of a large worm wheel attached to the forward part of the main frame and of course concentric with the pivot.

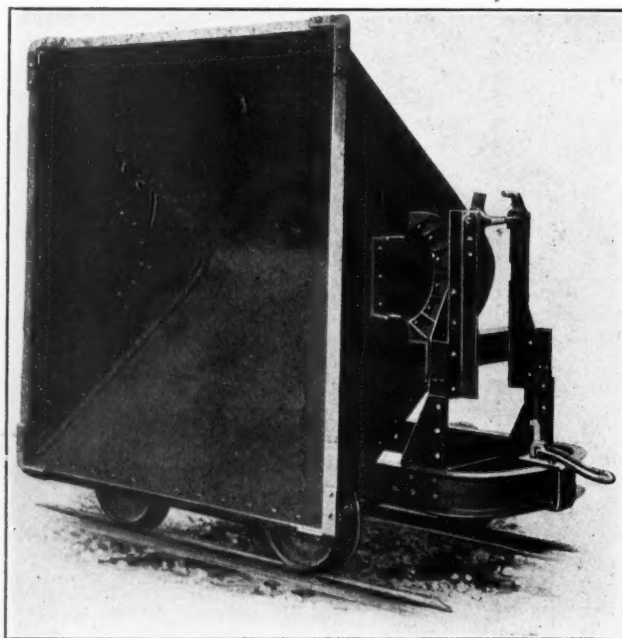
The steel frame which extends rearwardly from the pivot is mounted on steel-shod wheels and is regularly equipped with a steel body. This body consists essentially of a heavy plate iron or plate steel floor and strong steel side panels, above which stakes extend, connected by steel chains.

Although this is the standard body construction, any other kind can be placed on the frame; in fact only the forward unit may be purchased if necessary, so arranged that this can be attached to any kind of vehicle, after the front wheels of the said vehicle have

been removed. Consequently a very interesting feature is the possibility for a company to use its old vehicles, which have suitable bodies for its work, thus converting them immediately into motor-driven trucks of four-ton capacity, at a cost very much less than any four-ton truck could be purchased for, and with lower upkeep. Furthermore, the major portion of the load is merely carried on a body with steel wheels, thus saving the cost of rubber tires.

As this combination vehicle is pulled by the power-driven front wheels, and not pushed from the rear, it requires less power, it is said, to propel the given load, consequently less fuel consumption, and does away with skidding. Only 30 per cent. of the total load is required to give full traction to the front wheels, as the fixed front weight, plus about 15 per cent. of the load weight only, gives all the tractive weight needed.

Rated as a four-ton vehicle, it carries 8,000 pounds, but is claimed to be strong enough for 10,000 pounds. The weight loaded would be under 15,000 pounds, and this vehicle can be operated with only \$20 license limit, loaded, under the new Pennsylvania State law.



CONTRACTORS' DUMP CAR.

BITUMINOUS ROAD PLANER.

Machine Trims High Places for Any Kind of Bituminous Roads.

The Headley Good Roads Co., Real Estate Trust Building, Philadelphia, makes a device which they call a bituminous road planer used behind a steam roller or horses to cut the bumps from sheet asphalt, bituminous concrete or macadam or oiled roads. The machine is essentially a road drag, provided with a series of tool steel cutting devices, capable of accurate adjustment. There are four cutting sections. Three of these are carried on bars running across the machine at right angles to the frame. The fourth cutting section, at the rear, runs obliquely across the frame. The cutting members of the first three sections are pieces of 1-in. square tool steel, the corner of each forming a sort of plow point or chisel. These chisels are so disposed on the three frames that no one of them follows another. All of them together cover nearly the whole surface of the road. The fourth oblique member is knife blade. This is made in three sections which can be inverted and are also interchangeable.

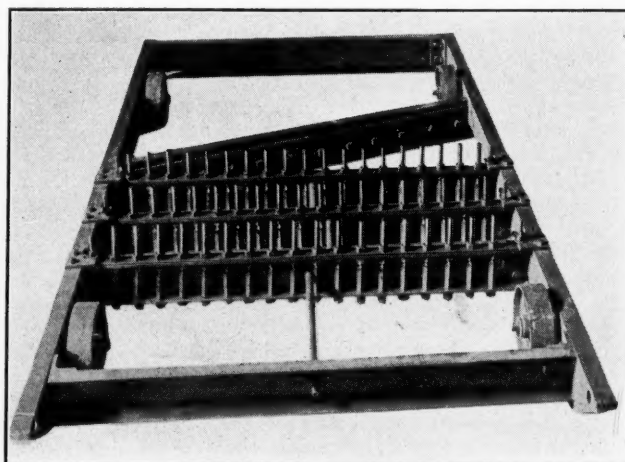
The outer frame constitutes a runner, which, however, is provided with wheels which may be used to take part of the weight, but are designed principally to carry the machinery when moving from one job to another.

Extra weight can be carried by the machine when needed. When in action the first row of cutters takes off the top of the bumps, the second cuts a little deeper and the third cuts to the bottom of the runner. The knife shaves off all loose material, either depositing it in the depressions or wasting it through the hole in the runner.

V DUMP CARS.

Lakewood Line of Contractors' Equipment Includes Two-Way Dump Cars Used in Road Construction.

The Ohio Ceramic Engineering Co., Cleveland, O., make the Lakewood line of contractors' equipment, the best known of which to municipal contractors is perhaps the concrete mixer. In view of the development in the con-



HEADLEY ROAD PLANER.

struction of roads during the last year or two, none probably deserves more attention than the V shaped 2-way dump car (No. 241) made of steel construction throughout. Cars of this type are used under about the following conditions: A base of supplies, on or near the road, that is within a mile or two. About two miles of track can be conveniently used in the highway being improved. The grades of the track must not be too steep or the country too rough. Under severe conditions traction engines do best, or where there are a number of bases of supplies. Lakewood cars are hauled in trains. On a nearly level track a team can pull about six loaded cars. A small contractor's locomotive can pull as many as fourteen, if the grades are moderate.

The general outlines of the car are shown in the illustration. The bodies are made of heavy sheet steel, reinforced in the corners, and around the top with angles. The frame is heavy channel, well braced. The cars have brakes. The Lakewood car discharges all the material freely. No pins or chains are required to prevent the body from tipping too far or to hold it in an upright position. When it is necessary to shovel material into cars it is often very convenient to lower one side of the body of a side dump car thus making the work for the operator easier. This can be accomplished with the Lakewood No. 241 by use of lugs at the end of the body.

These cars are made in the following capacities: 18 cu. ft., 1 cu. yd., 1½ cu. yds., 2 cu. yds. The 1 cu. yd. car, which is a convenient size for road contractors, weighs 950 pounds. The following are the principal dimensions: Width of body at top, 4 ft. 6 ins.; length of body, 4 ft. 6 ins.; height of body, 4 ft. ½-in.; track may be 24 or 30 ins.; wheelbase, 28 ins.; body made of No. 12 steel; diameter of wheels, 12 ins.; height from track to top of car, 5 ft. 5 ins.; clearance for dumping, 2 ft. 11 ins.; length between bumpers, 7 ft. ¾ ins.; diameter of axle, 1¾ ins.; size of channel iron frame, 5 ins.

Lakewood portable track is made to suit these cars including one, two and three-way switches. The 24-in. track weighs 15½ pounds per ft. and the 30-in. track, 17 pounds per ft.

American Motor Trucks on Parade.

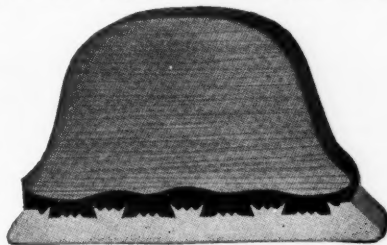
Prospective buyers of motor trucks, whether at present operators or about to purchase the first truck, will find a gold-mine of authentic information for purposes of comparison in Volume II of "Motor Trucks of America," now ready for distribution by The B. F. Goodrich Company.

The first volume, brought out last year, was so enthusiastically received that early in the year the decision was reached to make this digest of motor truck information an annual event, hence Volume II.

The current issue contains illustrations and specifications of over ninety trucks built in the United States. The data and photographs were furnished

by the manufacturers themselves, representing approximately 92 per cent of the motor truck production of the country. The information is full and accurate, covering every detail of interest in the make-up of the truck.

Typographically, the book is an excellent piece of work and is increased from the 68 pages of last year to 112



GOODRICH TRUCK TIRE.

for the 1914 issue. It is cross-indexed and contains, beside the truck photos and specifications, a reprint of "Efficiency in Buying and Operating Motor Trucks," as written for The Review of Reviews by W. A. McDermid.

Copies of this handbook may be secured by addressing The B. F. Goodrich Company, Truck Tire Department, at Akron, Ohio.

EXPANSION STRIP.

Report of Compression Tests of B and B Expansion Strip at Various Temperatures.

Robert L. Beck, 311 Arcade, Cleveland, O., sales agent for B. & B. Expansion Strip, has received from Maurice B. Greenough, care School of Applied Science, a report of compression tests on samples of the strips submitted. Samples measuring about 3 by 4 inches, ⅞ inch thick, were subjected to various pressures until they were compressed to a thickness of 3/16 inch. The tests were made at temperatures varying from 40 to 140 degrees F.

Commenting on the methods of testing and results Mr. Greenough says: "Plastic materials, having been com-

pressed and the load removed, do not return to their original shape, since they lack elastic properties. The B and B Expansion Strip is a plastic material, hence the only values which can be obtained in compression are maximum values of the load, which when applied to the sample under test will give a certain decrease in thickness. The maximum value of these tests was considered the load necessary to reduce the thickness of the sample from seven-eighths of an inch to three-sixteenths of an inch. The amount of this decrease is greater than the amount which would be required of the strip in actual service in the pavement, but it was thought better to determine the resistance to compression through this amount as an equal amount of compression in the pavement would be present only under extreme conditions, and hence would be the most severe test the strip would be required to undergo.

"From a study of the data herewith attached you will see that the decrease in pressures for the temperatures representing summer conditions is much less per degree rise in temperature than that representing cool weather conditions. This is an important feature, since it indicates a material which retains a fairly uniform condition, soft enough to provide for pavement expansion, but not soft enough to flow away, leaving an empty expansion joint."

INDUSTRIAL NEWS

Standards for Gas and Electricity.—Barrett & Company, 1503 Sanson street, Philadelphia, publish an attractive booklet showing line drawings of their designs for lighting standards. These include posts for single-inverted lamps, single ball, one to five inverted, combined trolley pole and cluster lights. Some of the standards are simple, others quite ornate.

(Continued on page 40.)

Test Numbers.	Temp. Deg's F.	Dimensions in Inches.	Area in Sq. Inch.	Unit Pressures		Average Unit Pressures	
				Total in Pounds.	Unit in Pounds.	Unit in Pounds.	Unit in Pounds.
1	40	3½ x 3¼ x ⅞	11.72	9,451	806	...	...
2	40	3 x 3¼ x ⅞	11.25	9,170	815	...	...
3	40	3 x 3¼ x ⅞	11.25	9,230	820	814	...
4	60	3 x 3⅞ x 1	11.63	8,240	709	...	...
5	60	3⅞ x 3¼ x 1	11.93	8,115	680	...	...
6	60	3½ x 3⅞ x 1	11.93	8,320	697	695	...
7	80	3 x 3⅞ x ⅞	11.06	4,940	446	...	...
8	80	3 x 3⅞ x ⅞	10.87	5,380	495	...	...
9	80	3 x 3⅞ x ⅞	11.06	5,050	456	466	...
10	100	3 x 3⅞ x ⅞	11.63	2,660	229	...	...
11	100	3 x 3¼ x ⅞	11.25	2,820	251	...	...
12	100	3½ x 3⅞ x ⅞	12.11	2,930	242	241	...
13	110	3⅞ x 3⅞ x ⅞	11.93	2,360	198	...	...
14	110	3 x 3⅞ x ⅞	11.63	2,490	214	...	...
15	110	3 x 3⅞ x ⅞	11.63	2,360	203	205	...
16	115	3 x 3⅞ x ⅞	11.63	2,120	182	...	...
17	115	3 x 3¼ x ⅞	11.25	1,940	172	...	...
18	115	3 x 3¼ x ⅞	11.25	2,050	182	179	...
19	140	3½ x 3⅞ x ⅞	11.33	1,640	144	...	...
20	140	3 x 3¼ x ⅞	11.25	1,550	138	...	...
21	140	3 x 3⅞ x ⅞	10.87	1,620	149	144	...

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
La.	New Orleans.....	noon, Jan.	3.. Main public highway	W. E. Atkinson, St. Hwy. Cmr.
Wash.	Kelso	Jan.	5.. Highway construction; cost, \$73,880.....	Cowlitz Co. Comrs.
Ind.	Huntington	Jan.	5.. Five gravel roads	H. Guthrie, Co. Aud.
Ind.	Jeffersonville	Jan.	5.. Gravel road	G. W. Stover, Aud.
Ind.	Danville	Jan.	5.. Highway	L. W. Borders, Co. Aud.
La.	Pointe La Hache.....	Jan.	5.. Constructing main highway	Hway Dept., New Orleans
Ind.	Hartford Cty	2 p.m., Jan.	5.. Macadam road	Co. Aud.
Ind.	Valparaiso.....	2 p.m., Jan.	5.. Gravel road	Comrs.
Ind.	Rensselaer.....	2 p.m., Jan.	5.. Macadam road	Comrs.
Ind.	Fowler.....	1 p.m., Jan.	5.. Roads in seven townships	Comrs.
Ind.	Williamsport.....	2 p.m., Jan.	5.. Highway construction	Co. Comrs.
Ind.	Vevay	1 p.m., Jan.	5.. Highway construction	Co. Comrs.
La.	Belle Plain	3 p.m., Jan.	5.. Paving, 55,718 sq. yds.; cement curb, 13,570 ft.....	W. M. Ewen, City Clk.
Fla.	Clearwater	Jan.	5.. Hard surfaced highway.....	C. W. Weickling, Clk.
Wash.	Calumet	Jan.	5.. Section Pacific Highway, cost \$33,880.....	R. C. Westwick, Co. Engr.
Fla.	Titusville	Jan.	5.. Road 4.65 miles	Brevard Co. Comm.
O.	Norwood	noon, Jan.	5.. Concreting roadway	F. A. Zimmerman, Dir. P. S.
Ill.	Peoria	3 p.m., Jan.	5.. Brick paving; estimated cost, \$28,008.....	L. J. Jeffries, City Engr.
La.	Walnut	Jan.	5.. Road work	Clk. Bd. Trustees.
Ariz.	Clifton	10 a.m., Jan.	5.. Graveling road	Bd. Supervisors.
O.	Springfield	2 p.m., Jan.	6.. Water bound macadam; estimated cost, \$15,298.80.....	Jas. R. Marker, St. Hwy. Com., Columbus.
N. Y.	Buffalo	11 a.m., Jan.	6.. Paving various streets	F. G. Ward, Comr. Pub. Wks.
Wis.	Kaukauna	1 p.m., Jan.	6.. Cement curbing	L. C. Wolfe, City Clk.
Ind.	Washington	2 p.m., Jan.	6.. Gravel roads, 2 jobs	L. S. Core, Aud.
O.	Portsmouth	2 p.m., Jan.	6.. Grading and paving roadway; estimated cost, \$16,407.52.....	Jas. R. Marker, St. Hwy. Com., Columbus.
O.	Lancaster	2 p.m., Jan.	6.. Water bound macadam; estimated cost, \$25,355.00.....	Jas. R. Marker, St. Hwy. Com.
Kan.	Manhattan	noon, Jan.	6.. Bridge approach with reinforced concrete.....	State. Engr.
Ala.	Montgomery	Jan.	6.. Street pavement, 16,000 sq. yds.....	R. Tate, City Treasurer.
Va.	Richmond	noon, Jan.	6.. Macadam road, 1 1/2 miles	Clk. Henrico Co.
Va.	Richmond	Jan.	6.. 1 1/2 miles macadam road	Co. Comrs.
Miss.	Kosciusko	Jan.	6.. Road improvement, 17 miles, gravel or crushed stone ..	W. B. Potts, Pres.
Ind.	Monticello	Jan.	6.. Road construction	A. G. Fisher, Aud.
Fla.	St. Augustine.....	10 a.m., Jan.	6.. Repair and upkeep of hard surfaced roads.....	W. W. Snow, Co. Aud.
Ind.	Crawfordsville.....	10 a.m., Jan.	6.. Gravel road	Comrs.
Ind.	Wabash	1.30 p.m., Jan.	6.. Gravel road improvements, 2 jobs.....	Co. Aud.
Ind.	Paoli	Jan.	6.. Road, 9,774 feet	E. A. Palmer, Co. Aud.
Ind.	Vincennes	Jan.	6.. Gravel road	J. T. Scott, Aud.
Ind.	Delphi	Jan.	6.. Constructing road	M. G. Haun, Aud.
Ind.	Madison	Jan.	6.. Gravel road	A. M. Taft, Aud.
O.	Columbus	2 p.m., Jan.	6.. Grading and paving with waterbound macadam; bridges and culverts; est. cost, \$15,298.80. Grading and paving with brick; est. cost, \$16,407.52. Paving with water-bound macadam; est. cost, \$25,355.	J. R. Marker, St. Hwy. Comr.
O.	Cleveland Hgts.....	noon, Jan.	6.. Grading streets	H. H. Canfield, Vil. Clk.
O.	Marion	Jan.	6.. Constructing road	Co. Comrs.
Ind.	Shelbyville.....	10 a.m., Jan.	7.. Road	Comrs.
Ind.	Portland	Jan.	7.. Construction of two roads.....	Comrs.
O.	Cheviot	noon, Jan.	7.. Labor and material for improving street.....	Village Clerk.
Ga.	Savannah	Jan.	8.. Furnishing cement gravel, 10,000 cu. yds.....	Co. Comrs.
N. Y.	Brooklyn.....	11 a.m., Jan.	8.. Paving streets, sidewalks, curbing and fencing.....	Boro. Pres.
Cal.	Los Angeles.....	11 a.m., Jan.	12.. Lowering tunnel grade, cost \$75,000.....	Bd. Pub. Wks.
Mont.	Missoula	Jan.	14.. Paving, 8,300 sq. yds. various materials.....	City Engr.
O.	Cincinnati	noon, Jan.	16.. Retaining wall and road improvement.....	Bd. Co. Comrs.
Fla.	St. Petersburg	Jan.	19.. Grading, curbing and paving.....	Bd. Comrs.
Mont.	Billings	Jan.	20.. Paving	City Clerk.
Fla.	St. Petersburg.....	Jan.	26.. Paving, vit. block; curbing with granite, 75,000 feet.....	Bd. City Comrs.
S. D.	Sioux Falls.....	9 a.m., Jan.	26.. Paving, 18,000 sq. yds.....	W. C. Leye, City Aud.
Wis.	Fond Du Lac.....	Feb.	1.. Cement paving, 3 miles.....	J. W. Forrester, Comr. Sts.
O.	Salina	Feb.	1.. Macadam, 4 miles	R. D. Smalley, Co. Engr.
Ind.	Laporte	Feb.	2.. Brick paving; cost, \$800.....	L. Drew, Engr.
SEWERAGE				
Tenn.	Gainesboro	Jan.	3.. Sewers, 1,000 ft.	M. J. Dixon, Ch. Com.
Minn.	Montevideo	8 p.m., Jan.	5.. Sanitary sewer, 2,142 ft.....	A. M. Parks, City Clk.
Mo.	Memphis	Jan.	5.. Vitrified pipe sewer; cost, \$20,000.....	Rollins & Westover, Engrs., Kansas City.
S. D.	Yankton	7.30 p.m., Jan.	5.. Lateral sewer	J. W. Summers, City Aud.
La.	Adel	Jan.	5.. Sewer including 1,320 ft. 8-inch pipe.....	V. T. Sweeley, City Clk.
Kans.	Atchison	Jan.	5.. Tile sanitary sewer, 4,100 ft.....	F. S. Altman, City Engr.
N. J.	Newark	2 p.m., Jan.	6.. Main intercepting sewer	J. S. Gibson, Clk.
Miss.	New Albany.....	8 p.m., Jan.	6.. General sewerage system	S. W. Beville, City Clk.
Ark.	Newport	Jan.	6.. Dredge ditches, 30 miles; drainage and excavations.....	Jones & Campbell.
Kan.	Fort Scott	5 p.m., Jan.	6.. Sewer extension	G. N. Sanford, City Clk.
Ill.	Joliet	10 a.m., Jan.	8.. Sewers, est. cost \$25,254.....	Bd. Loc. Impts.
N. Y.	Brooklyn.....	11 a.m., Jan.	8.. Sewer construction	Boro. Pres.
O.	Mt. Vernon	noon, Jan.	17.. Sewage treatment plant; sanitary trunk sewer.....	R. S. Blinn, Dir. Pub. Serv.
Neb.	Bancroft	8 p.m., Jan.	19.. Sewer; estimated cost, \$20,000.....	C. E. Barnes, Vil. Clk.
Minn.	Wabasha	Jan.	27.. Constructing sewerage system	J. M. Schouweiller, Vil. Rec.
La.	New Orleans.....	Jan.	30.. Drainage canal work	F. S. Shields, Sec. Sew. Bd.
Neb.	Scottsbluff	Feb.	3.. 8 to 10-in. pipe sewers and gravity sewage disposal plant, estimated cost, \$22,000.....	G. L. Shumway, City Clerk

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRY
Wis., Fond du Lac	.....Feb.	15..	Vit. pipe sewer, 1½ miles, 8 to 18-inch	J. F. Hohensee, City Clk.
Mont., Butte	.....5 p.m., Mar.	1..	Sanitary sewer	W. A. Willis, City Clk.
WATER SUPPLY				
Tenn., Gainsboro	.....Jan.	3..	Construction of two meter water tanks, pipe, etc.	M. J. Dixon, Ch. Com.
Miss., Vicksburg	.....5 p.m., Jan.	5..	Water main	A. M. Paxton, City Clk.
Kans., Arma	.....1 p.m., Jan.	5..	Constructing waterworks, including material and labor	City Clerk.
Wis., Oconomowoc	.....4 p.m., Jan.	6..	Fire well	W. F. Moldenhauer, Chman.
La., New Orleans	.....noon, Jan.	6..	Pumps and other water supplies	F. S. Shields, Sec. Sew. & Wat. Bd.
Ill., Winchester	.....7.30 p.m., Jan.	6..	Waterworks system	Fuller Coult Co., Engrs., St. Louis, Mo.
Mont., Columbus	.....Jan.	12..	Water works	G. A. Westover, Twn. Clk.
Mo., Potosi	.....7.30 p.m., Jan.	12..	Drilling 1,000-ft. well	Bd. Aldermen.
Wash., Shelton	.....Jan.	13..	Dam for water system	P. D. Fairchild, City Clk.
Cal., Newport Beach	.....Jan.	15..	Construction 4 miles of water main, cost \$25,000	L. S. Wilkinson, City Clk.
La., Winfield	.....About Jan.	15..	Water system	J. O. Kilbourne, City Clk.
Neb., F. ning	.....Jan.	15..	Water works	G. G. Bruckert, Vil. Clk.
Pa., C. tesville	.....8 p.m., Jan.	15..	Reinforced concrete dam and reservoir, sand filter plant and conduit, 13,900 ft.	A. Carmichael, Pres. Council
Can., Toronto	.....noon, Jan.	20..	Filtration plant	H. C. Hocken, Mayor
Minn., Wabasha	.....Jan.	27..	Complete water works system	J. M. Schouweiler, City Rec.
LIGHTING AND POWER				
N. Y., Blackwell's Island	.....Jan.	5..	Installing electric wiring, gas piping, etc.	Dept. Pub. Charity, N. Y. C.
W. Va., Williamson	.....Jan.	5..	Installation and maintenance street lights, 5 yrs.	City Council.
Mo., Glasgow	.....Jan.	5..	Generator, 60-cycle, 2,300 volts	R. L. Blacet, Supt.
Miss., Gulfport	.....Jan.	5..	Four-cycle gasoline tractor engine	F. S. Hewes, Clerk.
Kans., Arma	.....1 p.m., Jan.	5..	Electric lighting plant	City Clerk.
Va., Boyce	.....Jan.	5..	Franchise to install electric system	Town Council.
Cal., Alviso	.....Jan.	5..	Franchise to erect transmission lines	Clk. Bd. Trustees.
D. C., Washington	.....Jan.	5..	Telephone and electrical supplies	Maj. W. L. Clarke, Sig. Corps, U. S. A.
O., Columbus	.....noon, Jan.	5..	Fire and police telegraph equipment	B. L. Bargar, Dir. Pub. Serv.
Mass., Holyoke	.....2 p.m., Jan.	6..	4,000-K.W. turbine units and surface condensers	J. J. Kirkpatrick, Mgr. Gas & Elec. Dept.
D. C., Washington	.....10 a.m., Jan.	6..	Horizontal boring and milling machine	T. J. Cowie, Paym. Gen. U.S.N.
Fla., Key West	.....10 a.m., Jan.	6..	Watt-hour meters	T. J. Cowie, Paym. Gen. U.S.N., Wash., D. C.
Kans., Neodesha	.....8 p.m., Jan.	7..	Engine type alternator with exciter, etc.	J. J. Carroll, City Clk.
R. I., Central Falls	.....2 p.m., Jan.	7..	Wiring system	F. H. Jones, Sec.
D. C., Washington	.....Jan.	9..	Remodeling power plant	Chief Clk., Dept. Interior.
O., New Brennon	.....noon, Jan.	10..	Motor driven water pump	E. R. Haines, Village Clk.
D. C., Washington	.....Jan.	10..	Switchboard, electric cable, miscellaneous electrical apparatus, etc.	Isthmian Canal Comm.
Mo., Fulton	.....Jan.	14..	2 h-p. boilers	M. F. Bell, Arch.
Wis., Wauwatosa	.....Jan.	15..	Installation electric light and power system	L. G. Widule, Co. Clk., Milwaukee
Can., Ottawa	.....Dec.	15..	Gutta percha cable	R. C. Desrochers, Dept. Pub. Wks.
Neb., Bruning	.....Jan.	15..	Lighting plant	G. G. Bruckert, Vil. Clk.
Fla., Jacksonville	.....8 p.m., Jan.	15..	Magnetite tub transformers; arc light equipment	Trustees Water Works.
Mass., Boston	.....Jan.	15..	Pumping plant for high pressure	Comr. Pub. Wks.
D. C., Washington	.....Jan.	19..	Electric conduit, wiring and interior lighting fixtures	Supv. Arch.
Ga., Atlanta	.....Jan.	20..	Lighting fixtures and lamps	Co. Comrs.
La., New Orleans	.....noon, Jan.	30..	Electrical machinery, drainage canal work	G. G. Earl, Gen. Supt.
FIRE EQUIPMENT				
Pa., Jeannette	.....Jan.	5..	Erecting new station	Boro. Council.
N. Y., New York	.....Jan.	5..	One Gasoline fire engine	Depot Q. M., U. S. A.
N. J., Red Bank	.....Jan.	5..	Two automobile pump fire engines	Boro. Clerk.
Wash., Puget Sound	.....10 a.m., Jan.	13..	Quantity of hose	Bureau Supplies, Navy Dept., Wash., D. C.
Cal., Mare Island	.....10 a.m., Jan.	13..	Quantity of hose	Bureau Supplies, Navy Dept., Wash., D. C.
BRIDGES				
W. Va., Louisville	.....Jan.	5..	Reinforced concrete arch bridge, 100-ft. span	Co. Court.
Ind., Goshen	.....Jan.	5..	Bridge, 300-ft. span, concrete pier and abutment	Co. Comrs.
Miss., Kosciusko	.....Jan.	5..	Bridges and culverts, probably concrete	Highway Comrs.
S. D., Desmet	.....1 p.m., Jan.	6..	Steel or reinforced concrete bridges	W. M. Look, Co. Aud.
S. D., Woonsocket	.....noon, Jan.	6..	Steel and concrete bridges for 1914	J. Kingsburg, Co. Aud.
S. D., Aberdeen	.....Jan.	6..	Six bridges	Co. Comrs.
Miss., Hattiesburg	.....Jan.	6..	Three bridges	H. Gillis, Clerk.
S. D., Gann Valley	.....noon, Jan.	6..	Constructing bridges and repairs	W. H. Abernath, Co. Recorder.
N. D., Manning	.....Jan.	6..	Bridges, 16 to 100 ft. width	T. L. Evans, Co. Aud.
S. D., Canton	.....Noon, Jan.	7..	Bridges and culverts during 1914	T. O. Torbison, Aud.
Iowa, Charles City	.....noon, Jan.	7..	Bridges and culverts	H. B. Rosencranz, Co. Aud.
Miss., Batesville	.....Jan.	7..	Reinforced concrete bridge	J. B. Carothers, Clk.
Fla., St. Augustine	.....noon, Jan.	7..	Reinforced concrete bridge	City Clk.
S. D., Clear Lake	.....2 p.m., Jan.	8..	Steel and concrete bridges	A. J. Larsen, Co. Aud.
Mich., Saginaw	.....2 p.m., Jan.	8..	Highway bridge, 202 ft.	J. W. Ederer, Co. Rd. Comr.
O., Zanesville	.....11 a.m., Jan.	14..	Superstructure of bridge	F. C. Werner, Clk. of Comrs.
Ind., Salem	.....1.30 p.m., Jan.	15..	Repairing three bridges	F. S. Munkelt, Aud.
Tex., Houston	.....Jan.	15..	Reinforced concrete bridge; cost, \$140,000	City Clerk.
O., Cleveland	.....Jan.	21..	Bridge work	F. F. Goldenbogen, Clk.
MISCELLANEOUS				
Ill., Chicago	.....11 a.m., Jan.	3..	Lubricating oil	L. E. McGann, Comr. P. Wks.
Tenn., Gainesboro	.....noon, Jan.	3..	Furnishing materials and erecting jail	M. J. Dixon, Ch. Bldg. Com.
Ill., Chicago	.....11 a.m., Jan.	3..	Cast iron water pipes	L. E. McGann, Comr. Pub. Wks.
Miss., Kosciusko	.....11 a.m., Jan.	5..	Culvert pipes	X. A. Kramer, Engr., Magnolia.
Ill., Chicago	.....noon, Jan.	5..	Rapid transit subways	E. Block, Ch. Trans. Com.
Can., Megantic, Ont.	.....Jan.	5..	Concrete dam	J. Ray, Clk.
D. C., Washington	.....11.30 a.m., Jan.	5..	Bells, fuses, telephone condensers, etc.	Maj. W. L. Clark, Dis. Off., U. S. A.
S. D., Flandreau	.....2 p.m., Jan.	6..	Court house	G. A. Chorpensing, Co. Aud.
Colo., Grand Junction	.....3 p.m., Jan.	6..	U. S. Post Office	O. Wenderoth, Washington, D. C.
Miss., Pass Christian	.....Jan.	6..	Shell crusher	City Council.
N. D., Forman	.....2 p.m., Jan.	6..	Culverts for 1914	C. E. Fouts, Co. Aud.
Cal., Mare Island	.....10 a.m., Jan.	6..	Steel pipe	Pay. M. Gen., Navy Dept., Wash., D. C.
La., New Orleans	.....Jan.	6..	Pumps, 1 centrifugal, 11 screw; discharge pipes, gates, &c.	G. C. Earl, Gen. Supt.
Ill., Chicago	.....11 a.m., Jan.	6..	Furnishing natural and Portland cement for 1914	L. E. McGann, Comr. Pub. Wks.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Ill., Chicago	11 a.m., Jan.	6..Torpedo sand and washed gravel	L. E. McGann, Comr.Pub.Wks.
Va., Norfolk	10 a.m., Jan.	6..Galvanized wrought pipe	Bureau Supplies, Navy Dept., Wash., D. C.
N. D., Crafton	2 p.m., Jan.	7..Metal culverts	O. M. Fraser, Aud.
O., Salem	3 p.m., Jan.	7..U. S. Post Office	O. Wenderoth, Supv. Arch., Washington, D. C.
Can., Ottawa	Jan.	8..Heating and ventilating post office building.....	R. C. Desroches, Sec. D. P. W. City Council.
Cal., Oakland	Jan.	8..Furnishing material, labor for clock system.....	Co. Comrs.
O., Springfield	Jan.	10..County infirmary, cost \$95,000	Constn Q. M., U. S. Military Prison.
Kan., Ft. Leavenworth	2 p.m., Jan.	12..About 7,000 bbls. Portland cement.....	J. T. Cowie, Pay. M. Gen. U. S. N., Wash., D. C.
Cal., Mare Island	10 a.m., Jan.	13..Cast iron pipe, fittings and valves.....	Navy Payoffice, Seattle, Wash.
H. T., Pearl Harbor	Jan.	13..10,000 bbls. of cement	Isthmian Canal Comm.
D. C., Washington	Jan.	13..Cold rolled steel, wire cable, chain, etc.....	U. S. Reclamation Service.
Colo., Denver	Jan.	15..250,000 bbls. Portland cement.....	Supv. Arch., Wash., D. C.
O., Bellaire	Jan.	19..Post office	S. Smith, Ch. Com. Roads.
Ga., Atlanta	11 a.m., Jan.	20..Metal filing devices, furnishing court room equipment.....	U. S. Reclamation Service.
Mont., Great Falls	Jan.	20..Steel reinforcement bars, 750,000 lbs.....	Ch. Clk., Dept. of Commerce.
D. C., Washington	2 p.m., Jan.	20..Gasoline, panel body truck, 1,500 lbs.....	Supv. Arch., Wash., D. C.
Va., Bedford City	Jan.	26..Post office	Supv. Arch., Treas. Dept., Wash., D. C.
Miss., Clarksdale	Jan.	27..Construction Post Office and Court House.....	H. K. Cold, City Clk.
Fla., Key West	7.30 p.m., Feb.	3..30-ton incinerating plant.....	City Clerk.
Can., Ottawa	4 p.m., Feb.	3..About 85 miles welded steel pipe	

STREETS AND ROADS

Birmingham, Ala.—Construction of boulevard connecting all eastern suburbs is being discussed.

Fort Smith, Ark.—Petition for formation of new paving district that will supplant greater part of county's macadamized roads on north side of city has been filed in office of city clerk and will come up for action at next meeting of Board of Commissioners. Streets embraced in new district are North Ninth, from Garrison Ave. to B; North B from Ninth St. to Grand Ave.; North Towson Ave., from Garrison Ave. to Grand Ave., and Grand Ave., from Towson Ave. to east side of North 16th St.

Bridgeport, Conn.—Calling for enormous total of \$462,689 the annual requisition of committee on streets and sidewalks has been filed with city auditor. Main item is one of \$199,694 for permanent pavement already ordered, it including such streets as Elm St., Crescent Ave., Sterling St., Noble Ave., Park Ave. and completion of work on Stratford Ave. Sum of \$16,000 is asked for widening of Main St., between Bank and John on the west side, while \$19,740 is desired for street grading. No provision is made for constructing any water-bound macadam, but money is asked for constructing bituminous macadam on such streets as Arctic, Hallett, John, Pembroke and French Sts. and Clinton, Brooklawn, Myrtle and West Avenues.

Gainesville, Fla.—Property owners on Pleasant St., north of its intersection with Church St., have petitioned City Council to have brick paving extended to Boundary St. Petition has been referred to Board of Public Works.

East St. Louis, Ill.—D. O. Thomas, St. Clair County Highway Engineer, has received from State Highway Commission list of roads made under new Tice hard-road law. More than 200 miles of road will be built in St. Clair County, for construction of which the State and county will each pay half. It has not yet been decided what kind of road material will be used, but it is likely that concrete or water-bound macadam will be selected. These materials will cost between \$5,000 and \$8,000 a mile. Mr. Thomas will recommend to Board of Supervisors that a \$500,000 bond issue be submitted to voters, which will give county \$1,000,000 worth of new roads.

Sterling, Ill.—Plans are now being discussed to circulate petition to vote on single road commission proposition, and also to ask new county engineer to prepare estimates for cost of building three or four miles of permanent highways in Sterling township. It is part of plan to make permanent all of roads leading into Sterling, work to be carried on over period of several years.

Fort Wayne, Ind.—Board of Public Works will on Dec. 30 either modify or confirm orders entered on seven street paving jobs when bids were received. Board has ordered four streets paved with asphalt and three with brick. Paving bids received are as follows: Harrison St., First to Putnam—Moellering Construction Co., Metropolitan or other blocks, \$9.09 per lin. ft.; Grace Construction Co., \$8.81 for Trinidad pitch lake asphalt and \$8.57 for anchored bitumin-

ous concrete; Brooks Construction Co., \$9.15 for Metropolitan block and \$9.29 for Bessemer block. Preliminary order was entered for asphalt. Wagner st., from Spy Run Ave. to a point 300 ft. east of North Hanna St.—Moellering, \$7.60 per lin. ft. for Metropolitan or other block; Grace, \$7.35 for Trinidad asphalt and \$7.11 for anchored bituminous concrete. Preliminary order for Metropolitan block. Oliver St., Thayer to Eckart—Moellering, \$8.04 for Metropolitan or other block; Grace, \$7.53 for Trinidad asphalt and \$7.33 for anchored bituminous block; Brooks, \$7.79 for Metropolitan block and \$7.91 for Bessemer block. Preliminary order for asphalt. Killea St., Calhoun to Hoagland—Moellering, \$7.08 for Metropolitan or other block; Grace, \$6.53 for Trinidad asphalt and \$6.35 for anchored bituminous concrete. Preliminary order for asphalt. Francis St., Erie to Hayden—Concrete base: Moellering, \$8.56 for Metropolitan or other block; Grace, \$8.15 for Trinidad asphalt and \$7.91 for anchored bituminous concrete; Brooks, \$8.61 for Metropolitan block and \$8.74 for Bessemer block. For broken stone foundation: Moellering, \$7.38 for Metropolitan or other block; Brooks, \$7.69 for Metropolitan block and \$7.80 for Bessemer block. Preliminary order entered for brick block on crushed stone foundation. Huestis Ave., Fox to Miner—Moellering, \$6.77 for Metropolitan or other block; Grace, \$6.44 for Trinidad asphalt and \$6.31 for anchored bituminous concrete. Preliminary order for brick. Eliza St., Gay to Winter—Moellering, \$8 for metropolitan or other block; Grace, \$7.63 for Trinidad asphalt and \$7.41 for anchored bituminous concrete; Brooks, \$7.95 for Metropolitan block and \$8.07 for Bessemer block. Preliminary order for asphalt. The bid of the Moellering Co. on the paving of the alley between Berry and Wayne Sts., Barr to Lafayette—\$2.96 per lin. ft.—was taken under advisement.

Fort Wayne, Ind.—Bids have been ordered for paving of Sherman St.

Indianapolis, Ind.—Thirteen resolutions have been adopted for street improvements.

Indianapolis, Ind.—Bids have been opened by Bd of Pub. Wks. for paving English Ave. from Big Four Ry. tracks to Keystone Ave. The bids received were: Marion Co. Constr. Co., asphalt \$3.75 per lin. ft. on each side of street, and \$2,300 for paving street and alley intersections; bituminous concrete, \$3.20 per lin. ft., and \$1,800 for intersections; Republic Constr. Co., asphalt, \$3.39 per lin. ft. and \$1,980 for intersections and bituminous concrete, \$3.14 per lin. ft. and \$1,900 for intersections.

Colfax, Ia.—At its annual meeting the River-to-River Road Association adopted resolution recommending that hard surface be adopted for great Iowa highway as soon as possible. As result campaign will be opened to bring road to permanent level within a year and to start, immediately afterwards, hard surfacing of road.

Topeka, Kan.—Petitions have been presented to the City Commission for 64 blocks of paving of streets and alleys in city during year 1914. Brick and asphaltic concrete are materials asked for.

Louisville, Ky.—Ordinances for eliminating offset in 15th St. at its intersection with Southern Railway at Magnolia

St. are being prepared for submission to General Council by City Engineer Lyman.

Lake Charles, La.—Ninety thousand dollars in parish bonds, with which Calcasieu Parish will build good roads, have been sold. The bonds were taken by two Lake Charles trust and savings companies.

New Orleans, La.—State Board of Engineers, highway division, will begin advertising in next few days for bids for construction of roadway between New Iberia and Burke's Station, a distance of five miles. Highway will be gravel, with concrete culverts. Engineer Atkinson is in charge of highway department.

Pittsfield, Mass.—Plans of new state road from Lanesboro town line to point near Berkshire hotel at Coltsville have been filed with city clerk by State Highway Comm.

Missoula, Mont.—Bids will be opened on Jan. 14, 1914, for about 8,300 sq. yds. of pavement. Bids will be received on vitrified brick, creosoted wood block, bitulithic on a concrete base and asphaltic concrete on concrete base. F. E. Buck is City Engr.

Jersey City, N. J.—The Board of City Commissioners has approved plans for paving Concord St., from Hoboken Ave. to Fleet St. Charles A. Van Keuren is City Engr.

Passaic, N. J.—Bergen County Freeholders have sold bond issue amounting to \$300,000 which will be used for road purposes, to Kean, Taylor & Co., bankers, New York, at \$106.61.

Brooklyn, N. Y.—Plans have been made for widening of Ashland Pl.

Brooklyn, N. Y.—An important Queens authorization is that for regulating and grading Packard St., Long Island City, from Middleburg Ave. to Borden Ave., estimated cost, \$53,100. Authorizations in Brooklyn are as follows: Paving with asphalt (preliminary pavement), Eldert's Lane, estimated cost \$6,300; paving with asphalt (preliminary pavement) Crown St., estimated cost \$6,000; paving with asphalt (preliminary pavement) where not already paved, 94th St., estimated cost \$10,300. In Queens as follows: Regulating and grading Madison St., Ridgewood, estimated cost \$6,100; grading sidewalk space and flagging where necessary Thedford Ave., Morris Park, estimated cost \$5,300; regulating and grading Cornelia St., Ridgewood, estimated cost, \$2,300; regulating and grading South St., Long Island City, estimated cost \$1,800; regulating and grading Pickard St., Long Island City, estimated cost \$53,100; grading the sidewalk spaces and flagging when necessary Hillside Ave., Richmond Hill, estimated cost, \$1,600; paving with asphalt (permanent pavement), Sixth Ave., Long Island City; estimated cost, \$15,600; paving with asphalt (permanent pavement) Seventh Ave., Long Island City; estimated cost \$15,600; paving with asphalt (permanent pavement), Eighth Ave., Long Island City; estimated cost \$9,000; regulating and grading where necessary, and paving with asphalt (permanent pavement), Albert St. (11th Ave.), Long Island City; estimated cost \$7,000; curbing, flagging and paving with granite block (permanent pavement), William St., Long Island City; estimated cost, \$13,100; grading Harvard Ave., Jamaica; estimated cost, \$3,400; curbing and flagging Harman St., Ridgewood; estimated

cost \$4,600; regulating and grading, and paving with asphalt (preliminary pavement), Madison St., Ridgewood; estimated cost \$1,600.

Jamaica, L. I., N. Y.—Following are petitions adopted: For regulating, curbing, grading and laying sidewalks in North Curtis Ave., from Jamaica Ave. to Ridgewood (Stewart) Ave., Fourth Ward; for regulating, grading, curbing and laying crosswalks and sidewalks on north and south sides of Atlantic Ave., from Rockaway Beach Division of Long Island R. R. to Lefferts Ave., Fourth Ward; for regulating and paving, with permanent pavement, consisting of sheet asphalt on a concrete foundation, six inches in thickness, together with all work incidental thereto, in Lefferts Ave., from Liberty Ave. to Rockaway Blvd., Fourth Ward; for regulating and grading sidewalk spaces and laying sidewalks where not already laid to grade and in good condition, and all work incidental thereto in Freedom Ave., from Jamaica Ave. to Ashland St., Fourth Ward; for regulating and grading sidewalk spaces and laying sidewalks, where not already laid, and all work incidental thereto, in Palatina Ave., from Hillside to Palo Alto Ave., Fourth Ward.

Newburgh, N. Y.—Bonds in sum of \$98,500 have been awarded to Remick, Hedges & Co. of New York. Funds will be used for Liberty St. and lower Broadway paving contracts and Fullerton St. sewer.

Poughkeepsie, N. Y.—Extension of Market St. is being planned.

Pensacola, N. C.—There are good prospects for sand-clay highway connecting Burnsville with Asheville through Yancey and Buncombe Counties, or through Yancey, Madison and Buncombe Counties. The Yancey County bonds for good roads, amounting to \$125,000, have been sold, first installment of money paid to Treasurer D. M. Buck of Bald Mountain. Work on one of two routes to Buncombe County will begin soon. One route would connect direct at Maney Gap, 15 miles from Burnsville, and the other route would be through three or four miles of Madison County, entering at Ivy Gap.

Akron, O.—Ordinance has been adopted to issue bonds in sum of \$6,000 for purpose of widening Furnace St., from B. & O. Bridge westerly distance of about 600 ft. S. A. Priest is Clerk of Council.

Cincinnati, O.—Number of petitions have been received by County Commissioners for improvements to county roads. Among them was one asking to grade and build tarvia road through village of Reading.

Cincinnati, O.—Weil, Roth & Co. has secured \$41,500 4% street improvement bonds and \$20,000 more of same issue in two separate bids at premiums of \$1,071 and \$556, respectively.

Columbus, O.—Council Finance Committee has voted to put up to council ordinance appropriating \$20,000 for widening of North High St., from viaduct to 5th Ave.

Columbus, O.—State will give \$233,000 toward construction of highway from Cleveland to Sandusky.

Dayton, O.—Ordinances have been adopted for improvement of Lorain Ave. from the west end of Lot No. 21225 to Linden Ave.; improvement of Reisinger Ave., from Baker St. to Orchard Ave., and Kinnard Ave., from Wallace St. to Neibert St.

Dayton, O.—Proposition which is advanced by State, in connection with Inter-county and main market highway improvement throughout state, provides for payment of 50 per cent. of cost by commonwealth and remaining 50 per cent. to be borne by county which is to benefit by improvement. Commissioners' plan for disposing of Montgomery County share of cost is for county to pay 25 per cent. of cost, township trustees 15 per cent. and property owners 10 per cent. It is planned to make improved roadway 18 ft. wide, with 6-in. curbing. Estimated cost of this style of roadway is \$1,000 per mile.

Salem, O.—Improvement of New Garden road is being discussed.

Toledo, O.—Legislation for paving of Adams St. from Summit St. to Ashland Ave. has been approved by public improvements committee. Work probably will be started early in spring.

Xenia, O.—Deputy State Highway Comr. Sites is conferring with Co. Comrs. in regard to improvement of highways in Greene Co. Comrs. have made application for \$30,000 in state aid available to county if similar amount is furnished by county.

North Bend, Ore.—It is reported that the city will construct a road from

North Bend to Eugene. The cost is estimated at \$30,000.

Erie, Pa.—Proposition to open State St. is being considered.

Williamsport, Pa.—Continuation of extensive paving policy started by municipal legislative bodies is expected on part of new Council.

Providence, R. I.—Board has received and approved report of committee on widening corner of Arlington and Lloyd Aves. and corner of Arlington Ave. and Angell St.

Brackettville, Tenn.—Commissioners' Court of Kinney County has prepared road bonds to be issued and has ordered County Attorney Frank Lane to take transmission of all orders relating to elections for their issuance to Austin and present same to Attorney General's office for approval. Court has also authorized Mr. Lane to negotiate for sale of bonds as soon as possible so that work of building good roads throughout county can begin soon and be pushed to completion as fast as possible.

Chattanooga, Tenn.—The Riverside drive, or at least that portion between city limits at Citico Creek, and point where proposed drive will intersect with Glass St. in East Chattanooga, will probably be built in early spring. Bids for \$25,000 bonds for this purpose will be opened Jan. 2 by Judge Cummings and finance committee of County Court and local banks have agreed to take bonds at par unless some better bid is received.

Chattanooga, Tenn.—Three resolutions creating paving districts that are considered by members of Board of Municipal Commissioners to be most important passed under commission form of government have been passed. Districts created are: Market St. from 9th to the Nashville, Chattanooga & St. Louis Railway crossing. Market St., from the Nashville, Chattanooga & St. Louis Railway crossing to Main St. East 9th St. from Market St. to A St.

Nashville, Tenn.—Ordinances have been adopted providing for paving of various streets with brick on foundation of concrete; granite on concrete foundation; bitulithic on foundation of macadam and wood blocks on foundation of concrete. J. W. Dashiell is Secretary Board of Commissioners.

Austin, Tex.—Record for \$250,000 of road bonds for Hill County Road Dist. No. 1 has been submitted to Atty.-Gen. by Co. Judge J. D. Stephens of Hill Co. and Sen. W. C. Morrow, attorney. District includes Hillsboro and some fine roads are to be constructed.

Belton, Tex.—Commissioners' Court has ordered good roads bond issue election for Precinct No. 6 and parts of 4 and 5. This includes city of Temple. Amount petitioned for is \$600,000. Election will be held on Jan. 15.

Bonham, Tex.—Comr.'s Court has ordered election for Precinct No. 1 of Fannin Co. to determine issuance of \$300,000 bond issue for good roads. Election will be held Jan. 24.

Dallas, Tex.—Property owners are asking for extension of Sherman St., from Williams to Commerce and for grading and improving of entire street. Also property owners on Cleveland St. has decided to ask for paving of four blocks.

Fredericksburg, Tex.—Question of issuing road bonds in Gillespie County is being considered.

Lockhart, Tex.—To repair damages to roads and bridges in county caused by high waters, election has been ordered by County Commissioners' Court for January 17 on question of a special tax of 15 cents. Damage is estimated at \$40,000.

Lufkin, Tex.—City of Lufkin will pave the driveway surrounding City Park, Lufkin Ave., from the City Park to 2d St., and 1st St., from the tracks of the St. Louis, Southwestern Railway to Shepherd St. P. A. McCarthy & Sons, Lufkin, Tex., are City Engrs.

San Antonio, Tex.—Following are bids received for Houston St. paving: Because only creosote block paving was specified, but four bids were submitted. Each proposal was made in duplicate, one for five-year maintenance guarantee and the other without this clause. Where there was no maintenance guarantee price was about 2 cts. per sq. yd. less. First bid opened was from Foxhall & McCormick. For 3-in. blocks laid upon a ½-in. mortar cushion, the price was \$2.08 per sq. yd. 3-in. blocks on a ½-in. sand cushion, \$2.07; 3½-in. blocks on a 1-in. sand cushion, \$2.31; 4-in. blocks on a ½-in. mortar cushion, \$2.50; on a 1-in. sand cushion, \$2.50. Bid of H. L. Myers of Wichita, Kan., included laying of concrete base. This the city believes will not be

necessary, as Mr. Helland believes the foundation is in good condition. Creosote Wood Block Paving Co.'s bid was \$2.27 for 3-in. blocks on a ½-in. mortar cushion; 3½-in. blocks on a ½-in. mortar cushion, \$2.54; on 1-in. sand, \$2.75. Roach-Manigan Co. of Memphis and Fort Worth bid as follows: 3-in. blocks on ½-in. mortar cushion, \$2.26; 3-in. blocks on 1-in. sand cushion, \$2.22; 3½-in. blocks on ½-in. mortar, \$2.51; on 1-in. sand, \$2.49; 4-in. blocks on ½-in. mortar, \$2.71, on 1-in. sand, \$2.69. All of bids were referred to City Engr. for tabulation.

Stamford, Tex.—Investigations are being made by City Council of Stamford as to cost of paving about ten blocks on Stamford Ave., one of principal thoroughfares of city. There are six blocks in street paved already and owners have asked Council to pave ten more and movement is on foot by property owners to pay two-thirds of the cost, provided city will pay other third and street intersections.

Vernon, Tex.—Street improvement bonds in sum of \$16,000 have been approved.

Newport News, Va.—Plans for construction of board walk one mile long and bulkhead along shore line from Salter's Creek to residence of Col. W. J. Nelms are pending before Chamber of Commerce Committee on Parks.

Norfolk, Va.—Repaving of Main St., between Granby and Church, and Granby St., from Main to 18th, is being considered.

Vancouver, B. C.—F. L. Fellowes, City Engr., is preparing plans for various street improvements, estimated to cost \$175,000.

CONTRACTS AWARDED.

Pasadena, Cal.—To George Wiegand, contract for paving Madeline Drive at 7.25 cts. per sq. ft.

Pasadena, Cal.—To Thos. C. Breitenstein, 3932 Brighton Ave., Los Angeles, for improving streets in Road Improv. Dist., Nov. 15. His bid is as follows: 7,145 sq. ft. cement curb, 26 cts.; 29,308 sq. ft. cement gutters, 16 cts.; 147,302 sq. ft. oiled macadam, 7½ cts.; 7,000 cu. yds. excav., 36 cts.; 2 culverts, each \$315; total, \$20,061. Engineer is Louis A. Bartlett, Chamber of Commerce, Pasadena.

Bridgeport Conn.—Highway Commissioner Charles J. Bennett has awarded contract for construction of 9,077 linear feet of native stone macadam road on Hartford-Winsted road in Canton to A. B. Caldwell of New Britain. Bid was for \$16,534.50, and 80 working days are allowed for construction beginning from date of contract, December 22.

Jacksonville, Fla.—For 22,000 sq. yds. asphalt concrete paving, contract was awarded to C. S. Young Construction Company, Jacksonville, at \$1.605 per sq. yd. To same firm for 10,523 lin. ft. granite curbing, at 40 cts., and for 1,750 sq. yds. vit. brick gutters on concrete foundation, at \$2.30 per sq. yd. L. D. Smoot is Chief Engineer. Totals of bids are as follows: C. S. Young Const. Co., \$40,038.49; Southern Asphalt & Const. Co., \$40,308.80; Atlantic Bitulithic Co., \$41,464.45; Dunn & Lollonde Bros., \$44,517.30, and Union Paving Co., \$45,534.06.

Pocatello, Idaho.—For construction of gravel road from Pocatello to Neuf, by State Highway Commission, to S. W. Gleim, Pocatello, at about \$1,750 per mile.

Joliet, Ill.—To R. F. Conway Co., of Chicago, at \$6,722, for paving Clement St., between Western Ave. and West Jefferson St.

Greencastle, Ind.—By Co. Comrs., following road contracts: Earl Hurst \$12,000; Geo. W. Skelton Rd.; O. J. Larkin, \$9,390, Olive Rd., and O. G. Webb, \$11,045, Tinscher Rd.

Indianapolis, Ind.—By County Comrs. for following highway improvements: Paving with brick on W. 2d St., Marion, Ind., to O. J. Simons; building of Rhode stone road in Van Buren Twp., to John Slater and the graveling of the Fink Highway in Richland Twp. to Robert Malott.

Baton Rouge, La.—G. W. Prutsman, of Danville, Ill., the successful bidder for building of Baton Rouge-Hope Villa model road, has ordered his road outfit to be shipped to Baton Rouge, and expects to begin shortly after first of year. He will have among his equipment a portable railroad track, engine and cars. Road will cost \$60,000.

Baton Rouge, La.—Contract for construction of model road from Baton Rouge to Hope Villa has been signed. Work is to begin Jan. 15. Successful

bidder on construction, parish to furnish gravel, is G. W. Prutsman, of Danville, Ill., whose figures were \$35,978.80. Total cost of road will be \$60,000. Road will be superior to that originally planned, with more complete drainage, higher roadbed and concrete bridges. It will be model of this part of South.

Bossier, La.—For repairing Red River Bridge, to R. N. McKellar, at \$8,845.

Lake Charles, La.—For paving Broad St. with creosoted wooden blocks, by city, to M. Hyams, New Orleans, at \$36,000.

Lake Charles, La.—For constructing about 38,000 sq. yds. of brick paving in Lake Charles, by City Council, to Richie Bros., Lake Charles, at \$1.96 per sq. yd. E. L. Gorham is City Engr.

New Orleans, La.—Ordinances have been introduced at meeting of Commission Council accepting bids of Southern Bitulithic Co. for putting in subsurface drainage, gutter bottoms, etc., on both sides of Napole Ave., from Camp to Claiborne, and on lower side, from Claiborne to Broad, and also for paving these two areas with bitulithic.

St. Mary's City, Md.—Lowest bid received for grading 5.38 miles of road between St. Mary's City and Leonardstown was that of McDonald Constr. Co., of Mt. Vernon, N. Y., at \$37,361.

Fall River, Mass.—City Auditor has received and opened bids of contractors for work to be done in repairing Plymouth Ave. and Quequechan St. bridges and extension of Birch St. sewer to high water mark at shore, and contracts will be awarded in a very few days. Rendle & Stoddard of East Boston were lowest bidders on bridge contracts, their figures being \$3,088.62 for Plymouth Ave. and \$2,754.79 for Quequechan St. work. Only other bid received for these contracts was from W. E. Rendle of East Boston, who figured \$3,312.81 on Plymouth Ave. and \$2,857.90 on Quequechan St. bridge jobs. Beattie & Sornell of this city were the only bidders on the Birch St. sewer extension contract, and their price was \$7,306.75.

St. Paul, Minn.—Grading contracts have been awarded by Board of Public Works as follows: Grading Hewitt Ave. from Griggs St. to Lexington Ave., Keough Bros., \$1,600; grading an alley in block 2, Hamline Syndicate second addition, Keough Bros., \$198; grading Hubbard St. from Syndicate Ave. to Griggs St., Christ Johnson, \$359.56; grading Topping Ave., from Syndicate Ave. to Griggs St., Keough Bros., \$600; grading Marlboro Ave. from Dayton to Portland Ave., to Christ Johnson, \$3,811.69.

Kansas City, Mo.—To Siptcaufsky Bros., at 96½ cts. for grading of 115,000 cu. yds. of earth and rock from west side of Main St., between 24th and 27th Sts.

Dillon, Mont.—Lowest bid received for construction of 50,072 ft. of road in Beaverhead County is that of Clifton Applegate & Co., of Spokane, Wash., at \$13,575.

Omaha, Neb.—To J. E. Turner, 2616 Burt St., contract for grading portions of Arbor St., 34th St. and 43d Ave. Watson Townsend is City Engr.

Belleville, N. J.—Keen rivalry marked competition for contract for paving Washington Ave., Belleville, with asphalt block, proposals for which have been opened by the Com. on Rds. and Assessments of the Bd. of Freeholders. Five bids, ranging from \$2.44 to \$2.70½ per sq. yd., were submitted, lowest coming from Hastings Paving Co., of New York, to whom contract was tentatively awarded. Entire work, including 17,478 sq. yds. of pavement between Rutgers St. and Nutley line will at this figure cost \$42,646.32. Other bidders, their unit prices and estimated total for which they proposed doing work were: Van Keuren & Son, Harrison, \$2.45 per sq. yd., \$42,821.10; P. & P. Janerone, Montclair, \$2.46 per sq. yd., \$42,995.88; Newark Paving Co., \$2.54 per sq. yd., \$44,394.12, and the Barber Asphalt Co., of New York, \$2.70½ per sq. yd., \$47,277.99.

Penns Grove, N. J.—For construction of about seven miles of highway near Penns Grove, by County Commissioners, to John P. Holmes, Penns Grove.

New York, N. Y.—To Barber Asphalt Paving Co., 233 Broadway, for repairing asphalt pavement on Marginal St., North. East and Harlem Rivers, about 15,000 sq. yds., at \$1.47 per sq. yd., by Dept. of Docks and Ferries.

Syracuse, N. Y.—By Bd. of Contract and Supply, to Warner-Quinlan Asphalt Co. of New York City, contract for paving Rugby Rd. from James St. to Teall Ave., at \$8,219.60.

Tonawanda, N. Y.—For paving Clinton St., to Lawrence Schultz, of Fredonia, N. Y., at \$40,000.

Concord, N. C.—Contractor J. A. Walker has been awarded contract for laying 3,000 ft. of cement, which was recently ordered put down by Board of Aldermen.

Bismarck, N. D.—To Hugh Hortine, city, at 22½ cts. per cu. yd., for street grading on 7th St., etc.

Bryan, O.—By State Highway Comr., contract to Rolla M. Myers, Attica, O., at \$16,100, for constructing two miles of Angola-Mill Creek Road in Williams County.

Columbus, O.—To Mark & Mark, Washington Court House, O., at \$10,494, for construction of Angola-Mill Creek Twp. Rd., Williams Co., by State Highway Comr.

Columbus, O.—To Rolla M. Myers, Attica, O., at \$16,100, for 3,960 ft. of 16-ft. brick roadway in Fayette Co.

West Jefferson, O.—To W. C. Wooley, city, at \$1.81 per sq. yd. for grading and paving Main St., including curb.

Portland, Ore.—To Warren Constr. Co., city, at \$10,530, for paving of Broadway between Larrabee and Wheeler Sts., with bitulithic on concrete base.

Dorranceton, Pa.—To F. H. Parry, 19 Union St., city, at \$29,515, for paving of Market, Gates, Thomas, Goodwin and Loveland Sts., including 14,341 sq. yds. of bituminous concrete paving on concrete base, 8,281 lin. ft. of steel protected concrete curb, 526 lin. ft. curved curb and 1,801 lin. ft. concrete leaders.

Woonsocket, R. I.—The Aldermanic Committee on Streets and Bridges has awarded contract for furnishing curbing for next year to the Blanchard Bros. Granite Co., of Linwood, Mass., the lowest of several bidders. Appropriation for curbing next year is \$10,000. If city uses as much curbing as it now plans to do it will buy approximately \$5,000 worth of stone.

Harriman, Tenn.—A meeting of pike commissioners has been held at Kingston for purpose of letting contracts. Contracts included grading and macadamizing of four and a half miles of road on Richard Davis place toward May's school house, in second district, and was let to Frank L. Ladd. Letting of contract for road from Martin farm to Rockwood landing, in fourth district, was deferred.

Belton, Tex.—At meeting of City Council, contract was let to Texas Gravitoid Company of San Antonio for paving of business portion of this city. Contract calls for 1,700 sq. yds. of paving and 700 lin. yds. of curbing. The contract price is \$2.24 per sq. yd., the curbing being included as part of the paving. Work will be begun as soon as the drainage system is laid out. W. T. Montgomery, of San Antonio, who has the contract for road improvements in Precinct No. 1 of this county, is vice-president of the company and secured city contract. Territory to be paved is as follows: Main St. from its intersection with the south line of 2d Ave. to a point 90 ft. south of the south line of Ave. A. Central Ave. from its intersection with the east line of Main St. to its intersection with the west line of Wall St. Avenue A from its intersection with the east line of Main St. to its intersection with the east line of Penelope St. East St. from its intersection with the south line of 1st Ave. to its intersection with the north line of Ave. A.

San Antonio, Tex.—By Council, contract for paving of Houston St. with creosoted wooden blocks, to Roach-Manigan Paving Co. Foxall P. McCormick's bid was lower on the estimate for building up old concrete to grade and replacing with new concrete. McCormick's bid was \$7 a sq. yd., Roach-Manigan's bid was \$14.85 a sq. yd. Roach-Manigan was lower, however, on the estimate for removing old defective concrete and replacing with new concrete. McCormick bid \$8 a cu. yd., and Roach-Manigan bid \$7.55. Totals for work, exclusive of paving between the street car tracks, were estimated by Expert Engineer Pollock at: Roach-Manigan, \$19,251.20, and McCormick, \$17,747.20. It is believed the total cost of the entire job will be about \$30,000.

Seattle, Wash.—For constructing roadway from Central waterfront pier to Bell St., to Weymouth Construction Co., at \$12,797.

SEWERAGE

Douglas, Ariz.—Erection of new septic tank is recommended by City Engineer J. P. Sexton. Estimated cost, \$3,000.

Alhambra, Cal.—People will vote on \$250,000 bond issue for sewer system. About 55 miles of sewer pipe will be put down.

San Francisco, Cal.—Plans are being prepared for sewers in Locksley and 7th Aves., to cost \$22,000.

Bridgeport, Conn.—Sewers Com. of Bd. of Aldermen will ask for appropriation of \$88,000 when Bd. of Apportionment meets in February. Of this amount \$20,000 is to be used for new sewer construction, \$60,000 for construction of sewers ordered by Bd. of Aldermen during the last year and \$60,000 will be used for sewer wells.

New Smyrna, Fla.—J. N. Hazlehurst, of Atlanta, Ga., will prepare plans and estimates for sewer system.

Palmetto, Fla.—Citizens have voted to issue \$17,000 bonds for construction of sewers. W. B. Whitehead is Mayor.

Tampa, Fla.—Bids received for construction of Imhoff Sewerage system are all in excess of appropriations and have been rejected by Bd. of Pub. Wks. Engr. Alexander Twombly will completely revise plans for system.

Athens, Ga.—City will extend State Normal School sewer at cost of \$10,000. J. W. Barnett is City Engr.

Baltimore, Ind.—As result of city's inability to obtain par value for sewerage bonds recently disposed of, it has been practically decided to increase new sewerage loan to be asked of next Legislature from \$2,500,000 to \$3,000,000. The new sewerage loan will be used to sewer built-up portions of Northern, Eastern, Western, Locust Point and Port Covington sections of city, which at time when original plans of Sewerage Commission were formulated were in many instances nothing more than woods and fields.

Ft. Wayne, Ind.—Board of Public Works has rejected Lakeside and Forest Park sewer lift pump bids of Reeves & Skinner Engineering Co. on ground that they were higher than engineer's estimate.

Fort Scott, Kan.—Ordinance has been passed providing for construction and building of sewer to be designated and known as "Sewer Extension No. 7 to Sewer District No. 7" in City of Fort Scott. G. N. Sanford is City Clerk.

Lewiston, Ky.—Resolution has been adopted for construction of sanitary sewer on North Ashland Ave., from a point 50 ft. south of Bullock Ave. to point about 770 ft. north of Main St. J. J. O'Brien is City Clk.

Alexandria, La.—Bonds in sum of \$40,000 have been sold. Funds are to be used for extending sewer, paving, water and electric light service.

Silver Springs, Mo.—Harry Stevens, Union Trust Bldg., Washington, D. C., has prepared plans for construction of sewer system for Silver Springs, and same have been approved by County Comrs. at Rockville.

Ravenna, Neb.—Election will be held shortly to vote on issuing \$21,500 of bonds for sewer system. C. B. Cass is City Clerk.

Camden, N. J.—Ordinance has been adopted authorizing construction of sewers, culverts or drains in and along Eighth St. from Everett St. to Vanhook St., Vanhook St. from Eighth St. to German St., Fairview St. from Seventh St. to Tenth St., and Newport St. from Everett St. to Morton St. W. D. Brown is Clk.

Jersey City, N. J.—The Jersey City Comn. has decided to carry out its original project of constructing main line trunk sewer for Dover and Boonton and to build sewage disposal plant below Boonton dam. Term for maintenance of both sewer and disposal plant has been fixed at 40 years. Its object is purification of Rockaway River, Jersey City's water supply. Initial cost of constructing trunk line and disposal plant is estimated at \$450,000, as each of towns thus served will construct its own laterals, and cost of maintenance is placed at \$2,500 and \$3,000 annually.

Jersey City, N. J.—Plans are being made for reconstruction of section of sewer at Eighth St. and Division St.

Brooklyn, N. Y.—At last meeting of Board of Estimate and Apportionment, Queens occupied by far most prominent place on improvement calendar. There were 28 final authorizations for that borough, total estimate cost of which is \$363,600, and seven preliminary authorizations aggregating \$68,600, making a total for that borough of \$432,200. Brooklyn had twelve final authorizations, total estimate valuation of which is \$66,700, and fourteen final authorizations with total estimated valuation of \$92,800, making total for Brooklyn, \$159,500. Largest items of Queens' list of proposed public improvements are those relating to building sewer mains in Richmond Hill and Woodhaven districts, six of final authorizations aggregating in cost \$152,100, and one preliminary authorization estimated

to cost \$25,000, or total of \$177,100 was for this work.

Brooklyn, N. Y.—Petitions are being considered for construction of sewers on various streets in New Lots District.

Long Island City (L. I.), N. Y.—Petitions have been approved for extension of sewers in Laurel Hill Boulevard, Maspeth Ave., Rust St., Clinton Ave., Cassel Ave., Hobson and Joy Aves.

Jamaica, L. I., N. Y.—A number of petitions, including one for construction of sewer and appurtenances in Greenwood Ave., from Jamaica Ave. to point about 80 ft. north of Atlantic Ave., Richmond Hill, which will drain a large "lake" in Greenwood Ave. have been adopted by Jamaica Local Bd. Petition for work in Greenwood Ave. also included sewers in Fulton St., from Stoothoff Ave. to Bedford Ave., in Chestnut St., from Jamaica to Atlantic Aves., and Scott St., from Chestnut St. to Stoothoff Ave., all of which were adopted.

Cincinnati, O.—The Mill Creek sewer bonds in sum of \$600,000 have been awarded to syndicate composed of Hayden, Miller & Co., and Rhodes & Co., of Cleveland, and Merrill, Oldham & Co., of Boston.

Linden Heights, O.—Bonds in sum of \$20,000 will be sold by Village Clerk D. A. Shade until 12 noon, Jan. 12, for construction of drains.

Carbondale, Pa.—R. I. Giles, City Engr., is preparing plans for reconstruction of sewer system.

Williamsport, Pa.—Construction of sewer in Washington St. is planned.

Galesburg, Wis.—Bids will shortly be asked for construction of storm sewer in District No. 2.

Ottawa, Ont.—City Council is discussing construction of intercepting sewer to cost \$56,827. J. A. Ellis is Mayor.

CONTRACTS AWARDED.

Los Angeles, Cal.—To B. Zaich, at \$11,999, for construction of Channing St. sewer, from 9th to 10th Sts.

Santa Barbara, Cal.—To B. C. Nichols, W. 52d St., Los Angeles, at \$10,985, for construction of 6,500 ft. of sewer.

Santa Barbara, Cal.—For construction of about 6,500 lin. ft. of sanitary sewers, to the Modern Construction Co., 1023 Marsh-Strong Building, Los Angeles, at \$10,985.

San Francisco, Cal.—By Works Board to E. C. Storrie & Co. contract for repairing overflow structure in sewer at Fourth and Brannan Sts. for \$4,230.

Chicago, Ill.—By Board of Local Improvements for tile pipe sewers with brick manholes and catch basins in various streets to Achille Scully, Domenico Fosco, Carmine Roberts, Simon Ryan, George Pontorelli and P. J. McNulty Co.

Lafayette, Ind.—For construction of Main St. levee to Western Constr. Co., at \$61,000.

Hastings, Minn.—To John Lind, at \$28,000, for construction of Second St. trunk sewer system.

Tracy, Minn.—To H. J. Cathroe Co., Omaha, Neb., at \$2,641, for 1,326 ft. of 12 and 15-in. sewer and 3 manholes.

Kansas City, Mo.—By Board of Public Works, contract for construction of Sections 398 and 399 of the Joint Creek sewer, to W. C. Mullins, Kansas City, at \$48,500.

Trenton, Mo.—For construction of sewers in (a) District 9 and (b) District 10, to Hoover Bros., (a) \$18,127, and P. A. Johnson, Kansas City (b) \$10,155.

McCook, Neb.—To McCook Cut Stone Co., city, contract, at \$2,797, for constructing concrete septic tank. Mr. Stall is City Clerk.

Belleville, N. J.—To Philip & Peter Jannorone, of Belleville, at \$37,999, for constructing sewers.

Elizabeth, N. J.—To Thos. Viscount, of Elizabeth, for constructing vit. pipe 24 to 8-in. sewer in Summit Pl., at \$4,500. Thos. E. Collins is City Engr.

Binghamton, N. Y.—At meeting of Bd. of Contract and Supply, bids were opened for construction of sewer on Rush Ave. Proposals were submitted as follows: George Serafina, \$1,061; George Pignatello, \$1,123; Frank Stento, \$1,125; Michael Barber, \$1,189.52; Clarence Rose, \$1,392.64. Contract was awarded to Geo. Serafina of Binghamton.

Canton, O.—To Roderick D. Grant, Cleveland, O., at \$225,000, for construction of sewage disposal plant.

Ravenna, O.—By Director of Public Service, contract to H. F. Greene, city at \$7,000, for construction of storm water sewers on Central Ave., from Wahoo ditch to Prospect Ave.; on Day St., from Central to Beecher Ave., and Prospect Ave., from Central Ave. south.

Henrietta, Okla.—To J. O. Severns, of Oklahoma City, for construction of sewers in Dist. No. 2, at \$7,500. Engineers are Benham Eng. Co., Oklahoma City.

Sharon, Pa.—In accordance with recent order of Wheatland Council, 750 ft. of 17-in. sewer pipe has been contracted for by borough, to be used in laying sewer on Council Ave. Sewer will empty into 18-in. pipe of Sharon Foundry Co., and will drain swamp land just west of old canal. Work will be started under direction of Civil Engineer Fred Thomas as soon as pipe arrives.

Dallas, Tex.—Plans for sewage plant, which are being prepared by Engineer J. H. Fuertes, are expected to be ready within a couple of months.

Warwood, W. Va.—To George Sutton, of 16th St., contract for putting in new catch basins along Richland Ave., in Center Wardwood.

WATER SUPPLY

Rector, Ark.—City is having plans prepared for water works and sewerage systems.

Vineville, Ga.—Work will be started shortly on laying of new water mains; estimated cost, \$4,000.

Twin Falls, Ida.—City Council is considering plan to construct water works system to supply number of surrounding villages. Estimated cost of this project is \$750,000.

Grand Ridge, Ill.—Election will be held Dec. 31 to vote on bond issue of \$7,500 for installation of water works system.

Joliet, Ill.—Proposition to issue bonds for \$85,000—\$60,000 for high pressure fire system and \$25,000 for new fire apparatus—is under consideration.

Columbus, Ind.—Town of Edinburg will vote shortly on proposition to issue \$6,000 worth of bonds for improvements on waterworks plant of town. Many of residents of town are advocating sale of water works system.

New Albany, Ky.—The Indiana State Board of Health, in a finding in hearing given New Albany Water Co. in Indianapolis, on recommendation of State Board of Health that company install filtration plant in connection with New Albany water system, orders that filtration plant be installed. Cost of installing plant will be approximately \$80,000.

Alexandria, La.—Bonds in sum of \$40,000 have been sold. Funds are to be used for extending water, sewer, paving and electric light service.

Baltimore, Md.—Another step toward building of Baltimore's filtration plant will be taken shortly, when bids will be opened by Bd. of Awards for construction of steel or concrete main between Lake Montebello and the lake in Clifton Park. This contract involves excavation of 20,000 cu. yds. of earth and 500 yds. of rock, 5,000 ft. of 108-in. pipe, 3,000 ft. of 84-in. pipe, 28 tons of steel pipe specials, 21 tons of cast iron pipe and fittings, 6,000 cu. yds. of concrete, 16,000 lbs. of reinforced steel and shapes and 6,000 lbs. of steel castings. Bids will be opened also for Sewerage Comm. Contract No. 2 for construction of lateral sewers and house connections.

Beverly, Mass.—Plans of Beverly-Salem Water Commission for mechanical filtration plant to filter water from Ipswich River auxiliary supply have been presented by commissioners at hearing before State Board of Health at Boston.

Little Falls, Minn.—City attorney has been instructed to prepare resolution extending water mains on west side.

Superior, Neb.—At special election voters carried the \$22,000 issue of bonds for water works extension.

Reno, Nev.—City Council has passed over for a few days action on ordinance to submit Galena Creek water proposition to vote of the people, that city may decide whether or not to purchase system. Proposition has been offered to city for \$700,000.

Perth Amboy, N. J.—Initial steps for extension of water main for benefit of residents in Donald Ave. have been taken at meeting of Board of Water Commissioners.

Antwerp, N. Y.—Citizens have voted favorably on appropriation of \$5,000 to improve existing water system.

Oneida, N. Y.—Common Council has recommended to Board of Public Works the installation of electric pump to supply city with water from Oneida Creek.

White Plains, N. Y.—Following approval of Board of Trustees, which recently voted to withdraw appeal in matter of Drew water contract, Board of Water Commissioners has signed supplementary contract with John Drew of Castle Heights Water Co., and now vil-

lage is bound to take at least 600,000 gallons of water from this supply each day for next twelve years unless within that time plant is purchased.

Washington, N. C.—Board of Aldermen at Washington has secured option on water front site on Pamlico River as first step in establishment of municipal water terminal. Property, which will be first acquisition for big docking and warehouse scheme, has frontage on water of 300 feet at deep water, and will cost \$30,000. Lot will be occupied by large warehouses, trackage leading to railroad yards and driveways. Plan will require expenditure of considerable sum, for which bond election will be called.

Akron, O.—Ordinance has been adopted to issue bonds in sum of \$1,250,000 for purpose of extending, enlarging, improving, repairing and securing a more complete enjoyment of water works of city of Akron, O., and for the purpose of supplying water to said city. F. W. Rockwell is Mayor.

Covington, O.—Covington Council has placed itself on record as favoring immediate establishment of emergency main in order that citizens of former Latonia can be supplied with water. City Solicitor recommended that Council proceed with building of emergency main and that \$200,000 worth of bonds be issued to carry out this work.

Toledo, O.—J. G. Knapp, Jr., will urge installation of high pressure system.

Jackson, Tenn.—Statement has been given out by City Water Works Bd. explaining proposed \$35,000 bond issue for improving city water system, on which people of city will vote at special election to be held Jan. 19. Statement reviews development of water system from eight miles of pipe line to 45 and from daily consumption of 400,000 gals. to 2,600,000 gals., stating that it has required all surplus funds water system to buy machinery and equipment to furnish water to this ever increasing demand.

Beaumont, Tex.—City Council has ordered election for issuance of \$500,000 for purchase, maintenance and operation of water works, to be held Jan. 27. Resolution was subsequently adopted, accepting offer of President W. C. Teter, of Beaumont Water Works Co., to sell present water works system for \$400,000.

Brownwood, Tex.—City Council has signed contract for construction of filtering plant with capacity of 1,000,000 gallons daily. Work is to be started on new plant within 30 days and plant is to be completed and turned over to city within 90 days from beginning of work.

Corsicana, Tex.—Report has been made favoring extension of water mains on West Third Ave., from 28th St. to 30th St., and then south to Fifth Ave., and that city enter into contract with Water Supply Company for three additional hydrants.

Sulphur Springs, Tex.—City Engineer W. B. Baxter has complete survey at White Oak and estimated levels for city's new reservoir. Bonds were issued and sold several months ago for this purpose. Estimated capacity of new reservoir is 1,000,000,000 gallons. Work will begin as soon as weather will permit.

Lynchburg, Va.—Council Com. on Water has instructed City Engr. Harry L. Shaner to begin at once with preliminary arrangements necessary for installation of auxiliary source of water supply for city to be taken from James River, and department is already at work on preliminary plans for proposed improvement. Proposed auxiliary system is designed to equip pumping station with one or two pumps of sufficient capacity to pump enough water into the College Hill reservoirs to protect city in case of accident to gravity water supply.

Wellsburg, W. Va.—Bond issue of \$16,000 for waterworks improvements will be voted on at special election. New boiler will be purchased and water tester, and balance of money will be used for extension of water mains.

Wheeling, W. Va.—Appropriation of \$8,000 has been ordered to extend intake 250 ft.

Superior, Wis.—Estimates of cost of constructing a 25,000 gallon steel overhead tank for use in supplying water to new county workhouse have been received by members of county workhouse committee and contract let to Lakeside Bridge & Iron Co. of Milwaukee on bid of \$2,311, more than \$700 under nearest bid, and \$1,300 less than cost of work as estimated by board members. Bids on work were received from five concerns, varying from Lakeside Co.'s low price to estimate furnished by American Bridge Co. at \$3,625. Des Moines Bridge & Iron Co. made estimate at \$2,894, Chicago Bridge & Iron Co.,

\$3,250, and Minneapolis Machinery Co., \$2,894. Work on the structure will be commenced at once and tank will be ready for use when workhouse is completed in spring.

CONTRACTS AWARDED.

Burlingame, Cal.—By City Trustees, contract for construction of reservoir for water system, to Robert Frost, San Francisco, at \$14,000.

Hartford, Conn.—For furnishing 81 tons of 16-in., 112 tons of 12-in., 343 tons of 10-in., 95 tons of 8-in., and 17 tons of 6-in. cast-iron pipe and 10 tons of specials, to Fred A. Houdlette & Son, Boston, Mass., at \$14,652.50. Other bids as follows: John Fox & Co., New York City, \$14,754; Standard Cast Iron Pipe & Foundry Co., Bristol, Pa., \$14,951.10; U. S. Cast Iron Pipe & Foundry Co., Philadelphia, Pa., \$15,040.20; Warren Foundry & Machine Works, New York City, \$15,454; Florence Iron Works, Florence, N. J., \$16,547.35.

Chicago, Ill.—By Board of Local Improvements for water service pipe to James J. Renn, Daniel Hardin and David Walsh.

Westmoreland, Kan.—For construction of water system, to O'Neill Construction Co., Leavenworth, Kan., at about \$19,000.

Boston, Mass.—For laying about 2,750 lin. ft. of water pipe in various streets, to M. De Sisto, 13 Sheafe St., Boston.

Atlantic City, N. J.—By Board of Commissioners, for laying 24 and 20-in. water mains in Arctic Ave., from Missouri to Main Ave., to E. L. Bader, Atlantic City, \$39,695. Other bids as follows: Empire Construction Co., \$40,151; Whitmer & Cocco, \$41,131; Keeley-McFeeley Co., \$41,393; W. G. Fritz Co., \$41,937; W. P. Corson, \$42,040; J. I. Dick, \$44,801.

Atlantic City, N. J.—Six bids for laying syphon for 48-in. water main under Beach Thoroughfare have been received, but because bids were not worked out before adjournment no contract was awarded. It was reported that Contractor Eugene Boehm was low bidder at about \$24,000. Bids were received from McGovern Construction Co., Edward L. Bader, W. G. Fritz Co., J. Dick Co., and the Empire Construction Co. Specifications call for the sinking of 3,480 ft. of piling, construction of 87 caps, laying about 525 ft. of pipe, installation of six knuckle joints, some concrete work and about 5,000 ft. of timber.

Ridgewood, N. J.—To H. K. Corbin, city, at \$3,592, for 3,400 ft. of 6-in. cast iron force main.

Cherryville, N. C.—For construction of a water system, to B. F. Roberts, Macon, Ga.

Raleigh, N. C.—To J. G. Council & Co., at \$2,000 for construction of concrete foundation for new pump at water station.

Frankfort, O.—For installation of water works system to Harper-Rossiter Co., of Bremen, at \$13,775.

Superior, Wis.—For 25,000 gal. steel water tank and tower for work-house farm at South Range, to Lakeside Bridge & Tank Co., at \$2,311. W. J. Leader is Co. Clerk.

Panama.—By Isthmian Canal Comn., contracts for equipment for Miraflores purification plant. To American Water Softener Co., 1011 Chestnut St., Philadelphia, Pa., Class 1, Item 2, cast-iron pipe and fittings, etc., \$26,183; Item 4, effluent controllers, \$2,754; Item 5, filter-operating tables, etc., \$8,177; Item 7, steel pipe, galvanized brass, and piping, \$11,367; Item 8, part, \$890. To A. P. Smith Mfg. Co., East Orange, N. J., Class I, Item 3, hydraulic and miscellaneous valves and gates, \$10,175. To J. R. Kendall Co., Washington, D. C., Class 1, Item 8, part, \$3,600.

Vancouver, B. C.—To J. V. McAdam Co., at \$13,051, and S. J. Lund, at \$37,773, for construction of Vancouver-Point Grey partnership water pipe line.

LIGHTING AND POWER

Brewton, Ala.—City will shortly purchase one 150-kw. generator, one four-valve engine, directly connected to generator, one 175-H.P. boiler and one electrically-operated pump; also one series street lighting system complete. D. B. Hayes is City Clk.

Gadsden, Ala.—Proposition is being considered of installing municipal lighting plant.

Uniontown, Ala.—Managers of the municipal light and water plant are considering installation of one electrically-operated air compressor. George B. Foss is Supt.

Loveland, Cal.—Consulting Engr. has been employed to make investigations and submit estimates of cost of installing municipal electric light plant.

Pasadena, Cal.—On Dec. 27 people of Lamanda Park will hold election for purpose of forming street lighting district under new state law. Roughly speaking, idea is to have installed in district it is proposed to form, some 260 street lights.

Mystic, Conn.—Improvement of street lighting system along Main St. is asked for.

Bunker Hill, Ill.—Electric light committee is considering purchase of meters and lightning arresters. Harry McPherson is chairman.

Indianapolis, Ind.—An extensive investigation of the relative merits of gas and electricity for park and boulevard lighting purposes is to be taken up at once by Board of Park Commissioners. Parks and boulevards are now being lighted with gas. Contract expired some time ago, but service has been continued from month to month at contract rate.

Earlville, Ia.—Citizens are said to have voted bond issue for installation of municipal electric light plant.

Harrodsburg, Ky.—Twenty-four city electric light bonds of \$50 each have been sold by City Attorney Rankin to highest bidders, in accordance with vote at last November election, when question of voting bond issue of \$12,000 for purpose of increasing capacity of electric lighting plant was carried.

Alexandria, La.—Bonds in sum of \$40,000 have been sold. Funds are to be used for extending electric light service and water sewers and paving.

Beatrice, Neb.—City Council of Wymore is considering electric light proposition submitted by Nebraska-Iowa Public Service Co., which agrees to furnish street lights and current for pumping water at water works station for 3 cts. per kilowatt hour. Petitions for and against proposition are being circulated by Wymore citizens.

Plainfield, N. J.—Councilmanic Street Lighting Committee has directed Public Service Corporation to proceed with installation of new street lights.

Saratoga Springs, N. Y.—Plans are being considered for installation of "great white way" in Broadway and Division St.

Spencer, N. C.—City is contemplating installation of municipal electric light plant. Electricity for operating the system will probably be purchased. D. Fulk is City Clk.

Bellefontaine, O.—City Council is discussing question of authorizing issue of \$36,000 in bonds, proceeds to be used for improvements and extensions to municipal electric-light plant.

Canton, O.—Installation of municipal electric light plant is being discussed. Mayor Turnbull will ask City Council to call election to vote on question of issuing bonds for same.

Wooster, O.—Installation of ornamental street lighting system in business section is being discussed by Bd. of City Comrs.

Chelsea, Okla.—Plans are being made by town for installation of municipal electric light plant.

Philadelphia, Pa.—Illumination of city streets by electric lamps will cost city in 1914 approximately \$65,000 less than cost for this year. Reduction in price is made by reason of bid submitted by Philadelphia Electric Co., only concern to make proposal. Average price per lamp this year is \$88.88. Total contract is \$1,280,628. Average cost per lamp under new bid submitted will be \$84.35. After deducting free lighting service which is given city, cost will be reduced to about \$80 a lamp per year.

Philadelphia, Pa.—Director Cooke and Welsbach Street Lighting Co. entered into agreement to continue its present service for six months instead of two months, which company offered to do, and to reduce price \$1 per lamp per year, making it \$28 instead of \$29, the price paid this year.

Johnston, R. I.—Plans for lighting town of Johnston have been turned over to Council President Theodore F. Hughes. It was expected that committee on lighting would go over chart and if acceptable matter will be placed before people of town at special financial meeting.

Centralla, Wash.—City Engr. has been instructed to prepare plans and estimates of cost for extending lighting service to districts lying beyond improved section of city known as West Main St.

Tacoma, Wash.—With success of proposed plan to install "white way" lights along business streets of city, other

property owners have appeared and asked for more of luminous arc lights that are said by City Electrical Superintendent Collins to be latest and best thing in street lighting. Council has announced its intention to order down-town lights installed.

Niagara Falls, Ont., Can.—Instead of using arc lamps for illumination of River Road as at first intended, Council will probably decide upon ornamental standard surmounted by tungsten incandescent lamps. While nothing definite has been decided as yet, it is believed this form of lighting will be applied in case of River Road. Lamps are placed behind powerful reflectors in sheet metal box arrangements near tops of poles. Incandescent lamps would require less attention than arcs, and consequently would effect saving. System will cost approximately \$20,000.

CONTRACTS AWARDED.

Pilot Mound, Ia.—For construction of proposed municipal electric light plant, to Martin & Smedes Electric Co., of Des Moines. W. H. Groves, of Ames, Ia., Engr.

Linden, N. J.—Bids by Gas Co. and General Electric Co. for lights in borough have been accepted by Borough Council. Bid of electric company is on five-year contract basis for forty 40-candlepower lamps with privilege of altering candlepower. Contract includes commercial supply of current to merchants of Linden Borough.

New Brunswick, N. J.—By Board of Water Commissioners, contract for new boiler and stack at Weston's Mills pumping station to Hine Safety Boiler Co. Bid was \$5,475. The other bidders were: Babcock & Wilcox, \$5,799; Wickes Boiler Co., \$5,560; Worthington Boiler Co., \$5,790; Erie City Boiler Co., \$6,363.

Ellwood City, Pa.—By City Council to Harmony Co., contract for furnishing city electricity for lighting purposes for period of ten years.

Philadelphia, Pa.—To Standard Underground Cable Co., New York City, at \$4,945, for furnishing of 21,500 ft. of 25 pair No. 16 gauge paper insulated lead encased cable.

Corpus Christi, Tex.—But one bid, in accordance with advertised proposal, has been received when City Council met for purpose of opening bids for street lighting contract from the Corpus Christi Ice & Electric Co. Bids briefly summarized is to furnish following lights, each and every year, from dark to dawn for sums stated: thirty-seven 4-ampere, magnetite or luminous direct current arc lights of not less than 525 mean hemispherical candlepower, seventy-eight 100-candlepower Tungsten incandescent lights, and one hundred and twenty-four 50-candlepower Tungsten incandescent lights, for a sum approximating \$7,330 per year, on a basis of a 10-year contract, approximately \$8,142 per year on basis of 5-year contract. Under this bid, company agrees to furnish all of necessary equipment, which will entail expenditure of approximately \$8,000, and have service in operation by not later than May 1, 1914.

FIRE EQUIPMENT

Anaheim, Cal.—Election will be held Jan. 27 for voting on bond issue of \$10,000 for new station and \$5,000 for piece of motor apparatus.

Auburn, Cal.—Purchase of motor combination chemical and hose wagon is being discussed. Address M. Z. Lowell.

Napa, Cal.—Bond issue of \$12,000 has been voted for purchase of a motor engine and hose. C. F. Otterson is chief.

Petaluma, Cal.—A second piece of auto apparatus will probably be purchased.

San Jose, Cal.—Piece of motor apparatus will probably be purchased in about two or three weeks. John F. Mecklem is Fire Comr.

Bridgeport, Conn.—Although Board of Fire Commissioners has not yet completed its work on budget for next fiscal year, it is reported that members will request three appropriations for new work which will aggregate about \$86,000. It is understood that total appropriation to be asked for will be at least \$388,000, large proportion of which will be for salary purposes. This year's budget will include request for appropriation of \$12,000 for three motor tractors for hook and ladder trucks.

Aurora, Ill.—Chief George J. Rang recommends additional motor apparatus.

Des Moines, Ia.—City Council has adopted resolutions providing for issuance of bonds for \$103,000 to be used by